

LTR-NRC-14-15 NP-Attachment

# Phase 0 Meeting: Update of the Advanced Logic System

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# Agenda

- Introduction
- Background
- Summary of Changes
- Technical Documentation
- Process Overview
- Schedule
- Discussion and Wrap-up



# Introduction

- The NRC completed the Safety Evaluation Report (SER) of the Advanced Logic System (ALS)
  - Based on the ALS SER, the ALS Topical Report was approved in September 2013.
  - Westinghouse has been using the ALS on projects
- Westinghouse desires to update the ALS to provide better alignment with Operating Plant market needs as well as potential future applications in **AP1000** Protection and Safety Monitoring System (PMS).
- LIC-500, Rev 4, “Topical Report Process,” provides a process for revisions to an approved Topical Report
- Industry and the NRC are developing a standard Change Evaluation Process.
  - A standard is not available
  - Open communication is the best approach to ensure that we have a common understanding of how platform changes impact previous NRC Safety Evaluations

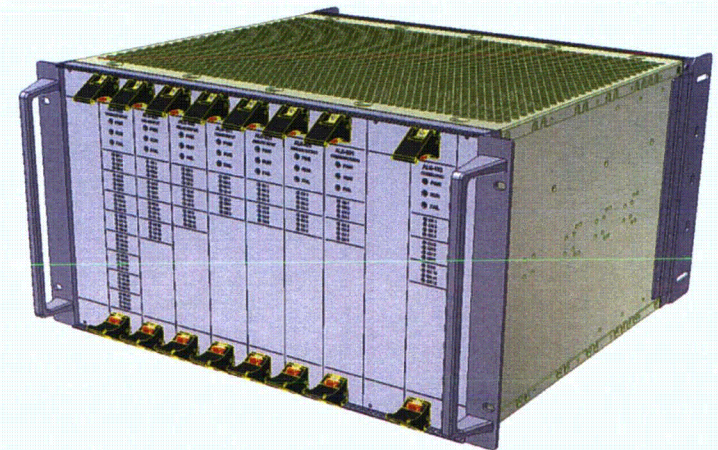




# Background

## Overview of ALS

<u>PART #</u>	<u>BOARD TYPE</u>	<u>CH#</u>	<u>DESCRIPTION</u>
ALS-102	Logic Board		FPGA Based Logic Board
ALS-302	Digital Input	32	Contact Input Board
ALS-311	Analog Input	8	TC / RTD Input Board
ALS-321	Analog Input	8	Voltage / Current Input Board
ALS-402	Digital Output	16	Solid State Contact Board
ALS-421	Analog Output	8	Voltage / Current Board
ALS-601	Communications	8	EIA-422/485 Comm. Board



### Per Section 3.1.2 of the Safety Evaluation Report:

*Six of the ALS platform standardized circuit boards provide generic input or output capabilities and do not require application-specific FPGA programming. However, the seventh circuit board, the ALS-102 Core Logic Board, does require application-specific FPGA programming.*

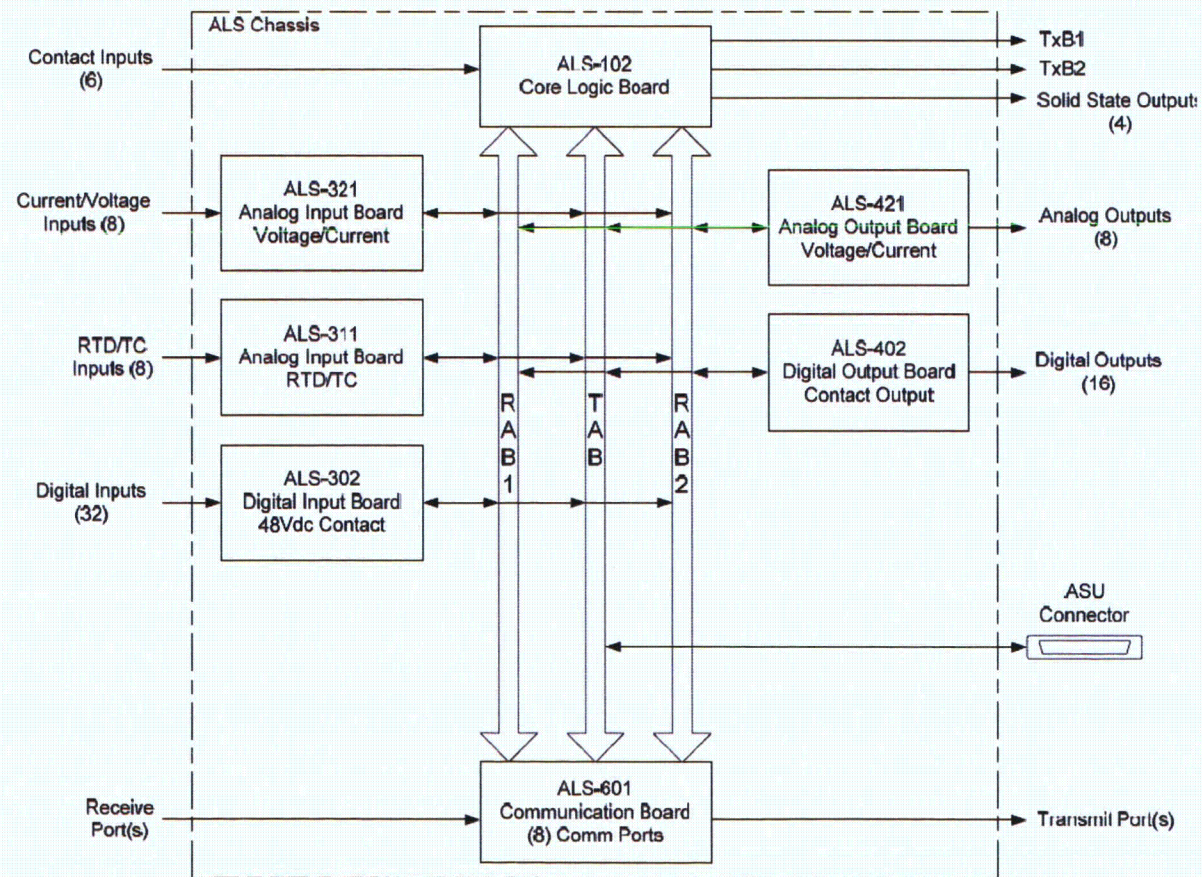
*Regardless, the use of each circuit board requires configuration of its internal non-volatile memory settings to select the functionality needed to meet application specifications from the options specified to be available for the circuit board.*



# Background

## Overview of ALS

### ALS Platform Architecture Block Diagram





# Background

## QA Program Migration

- From Section 3.10.2.3 of ALS SER:  
*“During the ALS platform development, **CSI [CS Innovations]** began transitioning its quality assurance program to comport with the “Westinghouse Quality Management System.”*
- Final ALS documents were submitted to the NRC for safety evaluation in February 2013
- The Scottsdale, AZ facility was closed in May of 2013 and work was transitioned to the Warrendale, PA facility



# Background

## QA Program Migration

- With the transition to the Warrendale, PA facility, additional actions have been taken with respect to the policies and procedures that govern work on ALS
  - WEC 23.20, The Westinghouse Nuclear Automation/CS Innovations Interface Agreement, has been retired
  - Some procedures have been revised, replaced, or superseded

*Although the transition to the “Westinghouse Quality Management System” was completed after the majority of the ALS platform development had finished, 10 CFR Part 50, Appendix B, does not prohibit changes to quality assurance programs that continue to fulfill the regulatory requirements, and holds licensees responsible for vendor quality. Licensees typically use audits, which are distinct from NRC staff regulatory audits, to fulfill this responsibility.*



# Summary of Changes



# Summary of Changes Overview

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# Summary of Changes

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ALS	
ALS-102	
ALS-302	
ALS-311	
ALS-321	
ALS-402	
ALS-421	
ALS-601	



# Summary of Changes

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# Summary of Changes

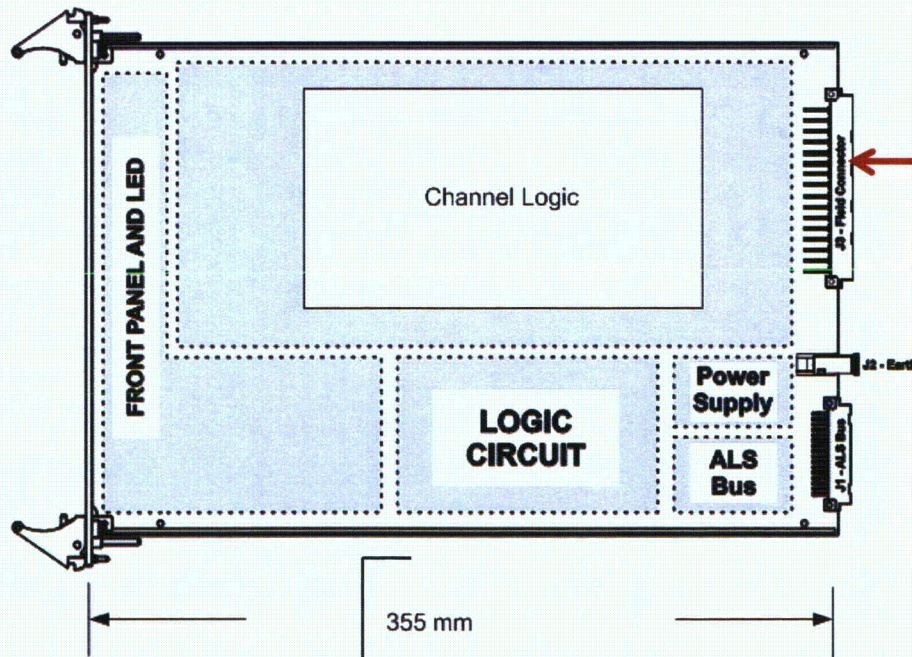
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ALS Card

ALS II Card

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# Summary of Changes

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# Summary of Changes

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- Per Section 2.5.8 of the ALS Topical

*“The RAB and TAB busses from the main ALS chassis are extended to the ALS Expansion Chassis so that the input/output boards in the Expansion Chassis can communicate to the ALS Core Logic Board in the main chassis”*

- Per Section 2.5.8 of the SER

*“Although the ALS platform has been designed to support this configuration, the external power supplies are not included as part of the ALS platform or its equipment qualification.”*

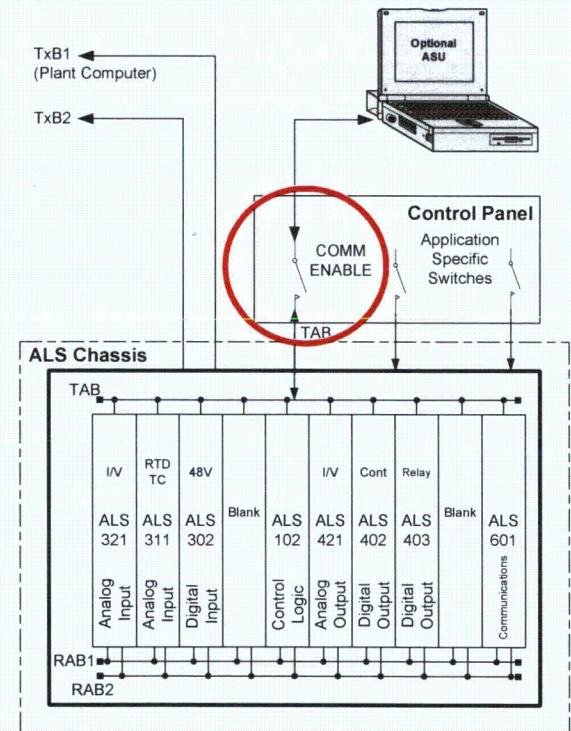




# Summary of Changes

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# Summary of Changes

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# Summary of Changes

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Board Description	ALS		a,c,e
Core Logic Board	ALS-102		a,c,e
Contact Input Board	ALS-302		
Temp. Sensor Board	ALS-311		
Analog Input Board	ALS-321		
Solid State Output Board	ALS-402		
Analog Output Board	ALS-421		
Communications Board	ALS-601		a,c,e



# Summary of Changes

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# Technical Documentation



# Technical Documentation

## ALS Documentation

### Example of ALS documentation referenced in the SER

Table 3.1.1-1 Docketed ALS Platform Development Documentation

Document ID	Title	Reference
6002-00007	ALS Platform Configuration Status Accounting	40
6002-00008	ALS Application Guidance	41
6002-00009	ALS Platform Requirements Traceability Matrix	42
6002-00010	ALS Platform Requirements Specification	43
6002-00011	ALS Platform Specification	44
6002-00030	ALS Design Tools	46
6002-00040	ALS Terms and Abbreviations	48
6002-00070	ALS EQ Rack System Specification	50
6002-00200	ALS Platform EQ Summary Report	51
6002-00240	ALS Platform Qualification Evaluation	52
6002-00400	ALS Platform Configuration Management Summary Report	53
6002-00500	ALS Platform VV Summary Report	54

Table 3.1.1-2 ALS Platform Development Documentation Available for Audit

Document ID	Title
6002-00019	ALS Platform VV Simulation Environment Specification
6002-00211	ALS EMC Qualification Report
6002-00212	ALS Seismic Qualification Report
6002-00213	ALS Environmental Qualification Report
6002-00214	ALS Environmental Test Procedure
6002-00215	ALS EMC Test Procedure
6002-00216	ALS Seismic Test Procedure
6002-00700	ALS Qualification Equipment Baseline Test Procedure

Table 3.1.4.1-1 Docketed ALS-302 Documentation

Document ID	Title	Reference
6002-30201	ALS-302 Requirements Specification	61
6002-30210	ALS-302 Core A Requirements Traceability Matrix	103
6002-30211	ALS-302 Core B Requirements Traceability Matrix	104
6002-30212	ALS-302 FPA, FMEA, and Reliability Analysis	62
6002-30216	ALS-302 VV Simulation Environment Specification	105
6002-30250	ALS-302 Configuration Status Accounting	63
6002-30281	ALS-302 Configuration Management Summary Report	64
6002-30282	ALS-302 VV Summary Report	65
6002-30294	ABTS-302 Test Summary Report	66

Table 3.1.4.1-2 ALS-302 Documentation for Audit

Document ID	Title
6002-30202	ALS-302 Design Specification
6002-30203	ALS-302 Core A FPGA Design Specification
6002-30204	ALS-302 Core B FPGA Design Specification
6002-30206	ALS-302 FPGA Design Specification
6002-30220	ASE-302 Test Simulation Environment Specification
6002-30221	ASE-302 Test Design Specification
6002-30222	ASE-302 Test Case Specification
6002-30225	ASE-302 Core B Test Simulation Environment Specification
6002-30226	ASE-302 Core B Test Design Specification
6002-30227	ASE-302 Core B Test Case Specification
6002-30228	ASE-302 Core B Test Procedure
6002-30242	ALS-302 Release Test Design Specification
6002-30245	ALS-302 Release Test Procedure
6002-30261	ABTS-302 Test Design Specification
6002-30262	ABTS-302 Test Case Specification



# Technical Documentation

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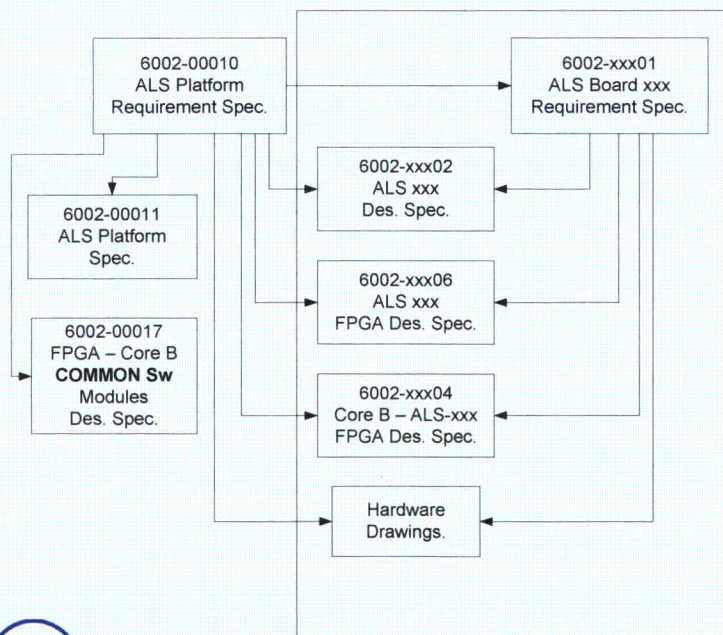
- The existing ALS technical document structure flow will be maintained
  - Configuration Control of the ALS documents will continue to be maintained via the 6002-00007 and all child documents

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# Technical Document Flow

6002 ALS Technical Document Flow





# Technical Document Flow

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ALS Document #	ALS Document Title
6002-00000	ALS Management Plan
6002-00001	ALS QA Plan
6002-00002	ALS Configuration Management Plan
6002-00003	ALS VV Plan
6002-00004	ALS EQ Plan
6002-00005	ALS Test Plan
6002-00006	ALS Security Plan
6002-00007	ALS Configuration Status Accounting
6002-00008	ALS Application Guidance
6002-00009	ALS Platform Requirements Traceability Matrix
6002-00010	ALS Platform Requirements Specification
6002-00011	ALS Platform Specification
6002-00018	ALS Platform FPGA VV Test Plan
6002-00019	ALS Platform VV Simulation Environment Specification
6002-00031	ALS Diversity Analysis



# Technical Document Flow

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ALS Document #	ALS Document Title	a,c,e
6002-40201	ALS-402 Requirements Specification	
6002-40202	ALS-402 Design Specification	
6002-40203	ALS-402 Core A FPGA Design Specification	
6002-40204	ALS-402 Core B FPGA Design Specification	
6002-40206	ALS-402 FPGA Design Specification	
6002-40210	ALS-402 Core A Requirements Traceability Matrix	
6002-40211	ALS-402 Core B Requirements Traceability Matrix	
6002-40212	ALS-402 FPGA FMEA and Reliability Analysis	
1200-40201	ALS-402, FPGA Binary, D003 Core A	
1200-40202	ALS-402, FPGA Binary, D003 Core B	
1202-40201	ALS-402 Configuration, NVM, Default Settings, D003	



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# Summary of Change Drivers to Docketed Information

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# Process Overview



# Development Process

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# Schedule



## Schedule Summary

- Document submittals will be done per ISG-06
  - ALS Topical Report, paragraph 12.7, provides a list of all documents

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## Discussion and Wrap-up