

Attachment 16

**Westinghouse Electric Company WNA-SD-00239-WBT-NP, Revision 4, "Software
Requirements Specification for the Post Accident Monitoring System"
Dated February, 2011**



Westinghouse Non-Proprietary Class 3

Nuclear Automation Watts Bar Unit 2 NSSS Completion Program I&C Projects

Software Requirements Specification for the Post Accident Monitoring System

**WNA-SD-00239-WBT-NP,
Rev. 4**

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WESTINGHOUSE NON-PROPRIETARY CLASS 3

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REVISION HISTORY

RECORD OF CHANGES

Revision	Author	Description	Completed
1	Shawn M. Downey	Initial Issue	06/10
2	Shawn M. Downey	- Addressed open items. - Addressed customer and internal comments. - Updated list of references and revision numbers - Corrected lists of RSEDs. - Added Rationales in support of requirements traceability. - Updated two RVLIS block diagrams. - Corrected units in Plant Computer datalink (Tables 7.2-1 and 7.2-2). - Added index to the Plant Computer datalink (Tables 7.2-1 and 7.2-2). - Corrected entries in the Plant Computer datalink (Tables 7.2-1 and 7.2-2). - Corrected the FE Keyswitch description in Section 2.1. - Revised the description of the RVLIS level alarm setpoint graphical depiction in R7.2.7 5. - Changed the CET margin alarm to be part of the SMM annunciator in R7.1.5.2-2 and R7.1.5.2-4. - Modified Figure 5.3-1 to eliminate the CI error bits 17-32. - Changed R5.2.1-1 and Figure 5.2-1 to have three CONTRMs. - Corrected display descriptions. - Corrected AC160 DB Element configuration settings in Section 4.2. - Revised the display resolution requirements in subsection 7.2.44. - Corrected the usage of "shall" throughout to indicate requirements exclusively. - Removed Communication Module (CI631) Error from Controller Ready logic. - Modified the analog output point scaling in R7.2.32-4. - Modified the System Health page description in subsection 7.2.17.	11/10

REVISION HISTORY (Cont'd)

RECORD OF CHANGES (Cont'd)

Revision	Author	Description	Completed
		- Added R7.2.2-16 to require the status indications in WNA-DS-01617-WBT, Table 2.6-5. - Eliminated requirements referring to process documents (these apply regardless). - Added new subsections for AC160 Memory Constraints, AC160 Operations, AC160 Site Adaptations, AC160 User Characteristics, AC160 Assumptions and Dependencies, AC160 Apportioning of Requirements, AC160 Availability, FPDS Memory Constraints, FPDS Operations, FPDS Site Adaptations, FPDS User Characteristics, FPDS Assumptions and Dependencies, FPDS Apportioning of Requirements, and FPDS Availability. - Revised Section 1.4 (Background).	
3	Shawn M. Downey	- Corrected typos. - Corrected rationales. - Corrected requirement number R7.2.8-6 to be R7.2.7-8. - Changed the FPDS configuration control requirement in R2.3.2 17. - Corrected table reference in R3.4-1. - Added exception to R3.4-2. - Corrected reference in R7.2.42-1. - Added clarification and corrections to R5.3.24-2 requirement, guidance, and rationale. - Corrected the RCS Pressure Low Range input to SM_MON. - Added subsection 7.2.57 (Print Screen) with requirements for controlling print screen using the FE keyswitch and button lock out between print jobs. - Deleted Requirement R5.1-2 which would allow the CPU load to be as high as 75%. - Added an exception for test signals to R5.4.3-8. - Clarified guidance in R7.1.4.3 49 regarding out-of-range signals. - Deleted Requirement R5.1.1-3 since it referred to "protective actions" and no such actions exist in the PAMS system. - Required OPC1_DET for thermocouple inputs in R4.2-8	11/10

REVISION HISTORY (Cont'd)

RECORD OF CHANGES (Cont'd)

Revision	Author	Description	Completed
		- Updated revisions in the References section. - Corrected name of the "CET Summary" page to be "Core Exit Thermocouples." - Corrected the three Corrected DP cell values sent to the plant computer to be in psfd rather than psid in Tables 7.2-1 and 7.2-2. - Clarified that the bypass or failure status is sent to the plant computer. - Add requirement R5.2.2-4 to require the exclusive use of "process data transfers." - Deleted requirement for matching times for DSP pairs in R4.3.1-3. - Deleted Requirement to fail all internally calculated and output signals when addressable constants are marked bad in R5.1.1-4. - Added exceptions to compliance with WNA-DS-01070-WBT in R2.3-3 and R3.1-2. - Changed wording of RCP statuses.	
4	Shawn M. Downey	- Updated references. - Per TVA letter WBT-TVA-1603, "Comments on the Revision 3 Documentation," the following changes were made: - Changed "FE switch" to "FE keyswitch" in Tables 7.2-1 and 7.2-2, items 101 and 102. - Changed "Enable" to "ENABLE" in Section 2.1. - Changed "active" to "ENABLE" in R7.2.14-6 and R7.2.16-7. - Changed "enabled" to "ENABLE" in R7.2.23-2, R7.2.25-2, R7.2.26-2, R7.2.31-4, subsection 7.2.56, and R7.2.57-4. - Per TVA letter WBT-TVA-1624, "Comments on the DRAFT System Design Specifications rev 4 and Software Requirements Specifications rev 4," the following changes were made: 7-36 / subsection 7.2.1: changed "SLE switch" to "SLE keyswitch" 5-28/R5.5-1 and 6-3/R6.2-1: Removed wording stating "hardwired FE keyswitch" since the project is not permanently installing the OM's	See EDMS

Revision	Author	Description	Completed
		FE keyswitch. Changed wording to "OM or MTP displays shall require the FE keyswitch to be enabled." ○ 7-65/R7.2.29-2: changed "in the enabled position" to "in the "ENABLE" position". ○ 7-64, subsection 7.2.29: changed wording from "SLE keyswitch to the deactivated position to reboot back to QNX" to "SLE keyswitch to the "OFF" position to reboot back into QNX." ○ 7-86, subsection 7.2.56: changed wording from "If the FE keyswitch is in the off (disabled) position" to "If the FE keyswitch is in the "OFF" (disabled) position" ○ 7-86/R7.2.57-2: changed "If the FE keyswitch is in the disabled position" to "If the FE keyswitch is in the "OFF" position" ○ Added quotations to the word ENABLE in the following places: ▪ 2-4, Section 2.1 ▪ 7-53 / R7.2.14-6 ▪ 7-54 / R7.2.16-7 ▪ 7-59 / R7.2.23-2 ▪ 7-61 / R7.2.25-2 ▪ 7-62 / R7.2.26-2 ▪ 7-67 / R7.2.31-4 ▪ 7-86 / subsection 7.2.56 ▪ 7-87 / R7.2.57-4 ○ 7-62 / R7.2.27-3: changed "when the SLE keyswitch is active" to "when the SLE keyswitch is in the "ENABLE" position". ○ 7-36 / subsection 7.2.1 revised description of FE keyswitch. • Corrected Memory Constraints section 7.1.18 and 7.2.50. • Deleted R5.1.1-2 and R5.4.3-5. • Deleted R8.2.1-1. • Revised password requirement in R8.2.1-12.	

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Watts Bar 2 NSSS Completion Program I&C Projects Post Accident Monitoring System – System Design Specification	WNA-DS-01667-WBT-P	4

OPEN ITEMS

Item	Description	Status
None		

TABLE OF CONTENTS

Section	Title	Page
	LIST OF CONTRIBUTORS	i
	REVISION HISTORY	ii
	TABLE OF CONTENTS.....	vii
	LIST OF TABLES.....	xii
	LIST OF FIGURES	xii
	ACRONYMS AND TRADEMARKS.....	xiii
	GLOSSARY OF TERMS	xvi
	REFERENCES	xviii
	REQUIREMENTS.....	xxii
SECTION 1	INTRODUCTION	1-1
1.1	OVERVIEW	1-1
1.2	SCOPE	1-2
1.3	OBJECTIVE	1-2
1.4	BACKGROUND	1-2
SECTION 2	GENERAL DESCRIPTION	2-1
2.1	FUNCTIONAL DESCRIPTION	2-1
2.2	SYSTEM ARCHITECTURE DESCRIPTION	2-2
2.3	GENERAL CONSTRAINTS	2-2
2.3.1	Naming Conventions	2-3
2.3.1.1	Node Names.....	2-3
2.3.1.2	AC160 PC Terminal Names	2-4
2.3.1.3	AC160 Communication Database (DB) Element Names	2-4
2.3.1.4	AC160 I/O Names	2-5
2.3.2	Configuration Control.....	2-5
SECTION 3	STANDARD SOFTWARE DESCRIPTION	3-1
3.1	AC160 BASE SYSTEM SOFTWARE	3-1
3.2	AC160 APPLICATION SOFTWARE DEVELOPMENT	3-2
3.3	FPDS APPLICATION SOFTWARE DEVELOPMENT ENVIRONMENT.....	3-3
3.4	FPDS APPLICATION SOFTWARE DEPLOYMENT	3-4
SECTION 4	AC160 DATABASE CONFIGURATION.....	4-1
4.1	OVERVIEW	4-1
4.2	HARDWARE DB ELEMENT CONFIGURATION	4-1
4.3	COMMUNICATION DB ELEMENT CONFIGURATION.....	4-3
4.3.1	DSP/DAT Configuration Requirements	4-3

TABLE OF CONTENTS (Cont'd)

4.3.2	MDAT Configuration Requirements	4-5
4.3.3	High Speed Link (HSL) Configuration Requirements	4-5
SECTION 5	PROCESS CONTROL PROGRAMMING	5-1
5.1	GENERAL	5-1
5.1.1	Initialization	5-1
5.2	STRUCTURE ELEMENT CONFIGURATION	5-2
5.2.1	General	5-4
5.2.2	PCPGM Structure Element	5-4
5.2.3	CONTRM Structure Element	5-5
5.2.4	FUNCM Structure Element	5-6
5.3	SUPERVISORY LOGIC	5-6
5.3.1	CPU Load Error	5-8
5.3.2	CRC Invalid Error	5-9
5.3.3	Application Program CRC Error	5-9
5.3.4	System Software CRC Error	5-10
5.3.5	DSP Error	5-11
5.3.6	Processor Module (PM646A) Error	5-11
5.3.7	Communication Module (CI631) Error	5-12
5.3.8	PROM Checksum Error	5-12
5.3.9	PM Status1 Word Error	5-12
5.3.10	CONTRM Run Error	5-13
5.3.11	I/O Module Errors	5-14
5.3.12	MDAT Error	5-14
5.3.13	HSL Receive Channel 1 and 2 Errors	5-14
5.3.14	Addressable Constants CRC Error	5-14
5.3.15	Addressable Constants CRC Warning	5-15
5.3.16	Application Trouble Error	5-15
5.3.17	Controller Ready Error	5-16
5.3.18	Processor In-Test Alarm	5-16
5.3.19	Application Specific Errors	5-16
5.3.20	Cabinet Status Alarms	5-17
5.3.21	I/O Channel Errors	5-17
5.3.22	Heartbeat	5-18
5.3.23	Watchdog Timer Supervision	5-19
5.3.24	Failure Notification, Indication, and Display	5-19
5.3.25	Error Recovery	5-20
5.4	SIGNAL QUALITY PROCESSING	5-22
5.4.1	General	5-22
5.4.2	Controller Ready	5-23
5.4.3	Input Signal Quality Processing	5-24
5.4.4	HSL Receive Error Processing	5-25
5.4.5	MDAT Receive Error Processing	5-25

TABLE OF CONTENTS (Cont'd)

5.4.6	DAT (AF100) Receive Error Processing	5-26
5.4.7	Plant Computer Datalink	5-26
5.5	ADDRESSABLE CONSTANTS DATA PROCESSING	5-28
SECTION 6	SURVEILLANCE TESTING FEATURES.....	6-1
6.1	CONTINUOUS ONLINE DIAGNOSTICS	6-1
6.1.1	AC160 Online Diagnostics	6-1
6.1.2	Flat Panel Display Online Diagnostics	6-1
6.2	MANUALLY INITIATED TESTING	6-3
SECTION 7	WATTS BAR 2 PAMS DESCRIPTIONS/REQUIREMENTS.....	7-1
7.1	WATTS BAR 2 PAMS AC160 SOFTWARE.....	7-1
7.1.1	General.....	7-1
7.1.2	Type Circuits and Custom PC Elements	7-1
7.1.3	Inputs	7-3
7.1.3.1	Analog/Digital Inputs	7-3
7.1.3.2	HSL Inputs.....	7-3
7.1.3.3	AF100 Inputs	7-3
7.1.3.4	MDAT Inputs.....	7-4
7.1.4	Processing	7-4
7.1.4.1	Input Processing.....	7-4
7.1.4.2	CET Monitoring.....	7-6
7.1.4.3	RVLIS Monitoring.....	7-7
7.1.4.4	Saturation Margin Monitoring	7-19
7.1.4.5	Timestamp Processing	7-21
7.1.4.6	System Status	7-22
7.1.4.7	Analog Output Testing.....	7-26
7.1.5	Outputs.....	7-26
7.1.5.1	Analog Outputs	7-26
7.1.5.2	Digital Outputs.....	7-27
7.1.5.3	HSL Outputs	7-28
7.1.5.4	AF100 Outputs.....	7-28
7.1.5.5	MDAT Outputs	7-31
7.1.6	Timing.....	7-31
7.1.7	Response to Abnormal Conditions	7-32
7.1.8	Application-Specific Errors	7-32
7.1.9	Error Recovery.....	7-32
7.1.10	Initialization	7-33
7.1.11	Communication DB Element Models	7-33
7.1.12	Naming Conventions	7-33
7.1.13	AC160 Constraints.....	7-33
7.1.14	AC160 Performance	7-34

TABLE OF CONTENTS (Cont'd)

7.1.15	AC160 Reliability	7-34
7.1.16	AC160 Maintainability	7-34
7.1.17	AC160 Portability	7-34
7.1.18	AC160 Memory Constraints	7-34
7.1.19	AC160 Operations	7-34
7.1.20	AC160 Site Adaptation Requirements	7-35
7.1.21	AC160 User Characteristics	7-35
7.1.22	AC160 Assumptions and Dependencies	7-35
7.1.23	AC160 Apportioning of Requirements	7-35
7.1.24	AC160 Availability	7-35
7.2	WATTS BAR 2 PAMS FPDS SOFTWARE	7-36
7.2.1	General	7-36
7.2.2	Display Pages	7-36
7.2.3	Directory	7-40
7.2.4	ICC Summary	7-40
7.2.5	Core Summary Display	7-42
7.2.6	Saturation Margin Display	7-42
7.2.7	Reactor Vessel Level Display	7-42
7.2.8	Level Bar Graphs Display	7-44
7.2.9	Reactor Vessel Level Sensors Display	7-45
7.2.10	Core Exit Thermocouples Display	7-45
7.2.11	Core Map Display	7-46
7.2.12	RCS Display	7-47
7.2.13	Trends	7-48
7.2.14	System Events	7-52
7.2.15	FPD Status List	7-53
7.2.16	Alarms	7-53
7.2.17	System Health Display	7-54
7.2.18	CRC and System Info	7-56
7.2.19	Setpoint Display	7-57
7.2.20	Bypass Display	7-57
7.2.21	Modify Setpoint/Bypass	7-58
7.2.22	Functional Tests Display	7-59
7.2.23	Annunciator Test Display	7-59
7.2.24	Display Pixel Test	7-60
7.2.25	Saturation Margin Test Display	7-60
7.2.26	Analog Output Test Display	7-61
7.2.27	Maintenance Display	7-62
7.2.28	RVLIS Constants	7-63
7.2.29	Loading AC160 Software	7-64
7.2.30	Input Monitoring	7-65
7.2.31	Load and Save Addressable Constants	7-66
7.2.32	Analog Output Selection	7-67
7.2.33	Modify Timeout/Modify Default	7-67

TABLE OF CONTENTS (Cont'd)

7.2.34	Plant Computer Datalink Processing	7-68
7.2.35	Legend Bar.....	7-78
7.2.36	FPDS Heartbeat	7-78
7.2.37	AC160 Heartbeat	7-79
7.2.38	FPDS Shared Memory Database	7-79
7.2.39	FE Keyswitch Interlock	7-80
7.2.40	FPDS System File Checker.....	7-80
7.2.41	FPDS Screen Savers	7-81
7.2.42	FPDS Software Development and Program Generation.....	7-81
7.2.43	FPDS RS232 Serial Communications Port.....	7-82
7.2.44	Display Resolution Requirements.....	7-82
7.2.45	FPDS Constraints.....	7-84
7.2.46	FPDS Performance	7-84
7.2.47	FPDS Reliability	7-84
7.2.48	FPDS Maintainability	7-84
7.2.49	FPDS Portability	7-85
7.2.50	FPDS Memory Constraints	7-85
7.2.51	FPDS Operations	7-85
7.2.52	FPDS Site Adaptation Requirements.....	7-85
7.2.53	FPDS User Characteristics.....	7-85
7.2.54	FPDS Assumptions and Dependencies	7-86
7.2.55	FPDS Apportioning of Requirements	7-86
7.2.56	FPDS Availability.....	7-86
7.2.57	Print Screen.....	7-86
SECTION 8	SAFETY AND SECURITY REQUIREMENTS	8-1
8.1	SAFETY	8-1
8.2	SECURITY	8-1
8.2.1	Cyber Security	8-1
SECTION 9	PROGRAM WIDE DATABASE (PWD) USAGE	9-1

TABLE OF CONTENTS (Cont'd)

LIST OF TABLES

Table	Title	Page
Table 2.3-1.	Train A AMPL Naming Conventions.....	2-4
Table 2.3-2.	Train B AMPL Naming Conventions.....	2-4
Table 5.3-1. [	] ^{a,c}	5-13
Table 5.4-1. [	] ^{a,c}	5-24
Table 7.1-1. [	] ^{a,c}	7-1
Table 7.1-2. [	] ^{a,c}	7-22
Table 7.1-3. [	] ^{a,c}	7-23
Table 7.1-4. [	] ^{a,c}	7-24
Table 7.1-5. [	] ^{a,c}	7-25
Table 7.1-6. [	] ^{a,c}	7-31
Table 7.2-1. [	] ^{a,c}	7-69
Table 7.2-2. [	] ^{a,c}	7-73

LIST OF FIGURES

Figure	Title	Page
Figure 5.2-1. [	] ^{a,c}	5-4
Figure 5.3-1. [	] ^{a,c}	5-21
Figure 5.4-1. [	] ^{a,c}	5-27
Figure 5.5-1. [	] ^{a,c}	5-32
Figure 7.1-1. [	] ^{a,c}	7-9
Figure 7.1-2. [	] ^{a,c}	7-10

ACRONYMS AND TRADEMARKS

Acronyms used in the document are defined in WNA-PS-00016-GEN, "Standard Acronyms and Definitions" (Reference 2) and NABU-DS-00115-GEN, "Safety System Standard Definitions" (Reference 3), or included below to ensure unambiguous understanding of their use within this document.

Acronyms	Definition
ABB	Asea Brown Boveri
AC160	Advant [®] Controller 160
ACC	AMPL Control Configuration
ACT	Active Application Program
AF100	Advant [®] Fieldbus 100 Network
AI	Analog Input
AMPL	ABB Advant Master Programming Language
AO	Analog Output
CD	Compact Disk
CET	Core Exit Thermocouple
CETMS	Core Exit Thermocouple Monitoring System
Common Q	Common Qualified Platform
CRA	Cable Redundancy Available
CRC	Cyclic Redundancy Check
DAT	Database element associated with AF100 communication
DB	Database
DB Elements	AC160 Database Elements
DI	Digital Input
DO	Digital Output
DSP	Data Set Peripheral
EUDH	Expected Uncompensated Dynamic Head
FCB	Function Chart Builder
FE	Function Enable
FPD	Flat Panel Display
FPDS	Flat Panel Display System
FPROM	Flash Programmable Read-Only Memory
HJTC	Heated Junction Thermocouple
HMI	Human-Machine Interface
HSL	High Speed Link
HWE	Hardware Error
I/O	Input/Output
ICC	Inadequate Core Cooling
IEEE	Institute of Electrical and Electronics Engineers
IP	Internet Protocol
MTP	Maintenance and Test Panel
NDH	Normalized Dynamic Head
OM	Operator's Module
PAMS	Post Accident Monitoring System

ACRONYMS AND TRADEMARKS (Cont'd)

Acronyms	Definition
PC	Process Control
PCH	Power Compensated Head
PHA	Preliminary Hazards Analysis
PhAB	QNX [®] Photon [®] Application Builder
PID	Point Identifier
PM	Processor Module
PPS	Plant Protection System
PRE	Process Error
PROM	Programmable Read-Only Memory
PWD	Program Wide Database
QA	Quality Assurance
RAM	Random Access Memory
RC1	Redundant Cable 1
RC2	Redundant Cable 2
RCP	Reactor Coolant Pump
RCS	Reactor Coolant System
RJT	Reference Junction Temperature
RTD	Resistance Temperature Detector
RVLIS	Reactor Vessel Level Instrumentation System
RVLMS	Reactor Vessel Level Monitoring System
SE	Severe Error
SLE	Software Load Enable
SMM	Subcooled Margin Monitor
SPDS	Safety Parameter Display System
SRR	Software Release Record
SWE	Software Error
TCP/IP	Transmission Control Protocol/Internet Protocol
UDH	Uncompensated Dynamic Head
UJTC	Unheated Junction Thermocouple
WDT	Watchdog Timer

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ACRONYMS AND TRADEMARKS (Cont'd)

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GLOSSARY OF TERMS

Standard terms used in the document are defined in WNA-PS-00016-GEN, "Standard Acronyms and Definitions" (Reference 2) and NABU-DS-00115-GEN, "Safety System Standard Definitions" (Reference 3), or included below to ensure unambiguous understanding of their use within this document.

Term	Definitions
A0650	Analog output module that converts digital signals from the Processor Module (PM) to analog signals. This module has eight output channels for 0-20 mA, 4-20 mA, -20-20 mA, -10-10V, 0-5V, 1-5V, and 0-10V ranges.
AAX	AMPL source code file.
AC160 Station	The entire AC160 Controller Station, which is made up of a single base station subrack (CI631, PM646A, and S600 IO modules) and any optional I/O station or extension subracks (S600 IO modules only). All PMs within the same AC160 Station share the same Advant Fieldbus 100 (AF100) bus address (base station subrack thumbwheel switch).
Addressable Constants	Any value within the AC160 software which is changeable, through an FPD.
AI687	The AI687 is a high speed analog input module that processes 0-100 mV, RTD, and Thermocouple signals.
AI688	The AI688 is a high speed analog input module that processes 0-1V, 0-10V, and 4-20 mA input signals.
BAX	Database source code file.
CI527	AF100 communications interface module that provides the AF100 high-speed bus control for the PC node box (FPDS).
CI631	AF100 communications interface module that provides the AF100 high-speed bus control for the AC160 station.
CONTRM	Control module process control (PC) element used for execution control of modules within a PC program.
CQRev	Common Q revision control system.
Cyber Security	Methods and tools used to protect computer systems against unauthorized access and manipulation.

GLOSSARY OF TERMS (Cont'd)

Term	Definitions
DAT	Database element representing values that are transferred over the AF100. A Boolean DAT is a database element that holds 32 individual Boolean data values. An integer or floating-point DAT holds one data value.
Data Set Peripheral (DSP)	Database element representing a block of data (up to eight DATs) to be received or sent over the AF100.
FUNCM	Function module structure PC element that has no execution effects and is used to help label/structure a PC program.
IDENT	Numerical representation that identifies the DSP on a given AF100. Range is between 1 and 50.
PCPGM	PC program structure PC element that defines the program header and is used for execution control of the overall application program on the Advant control system.
SYS-CRC	PC element that monitors the Cyclic Redundancy Check (CRC) taken from the operating system, the system software, all options, and the application program.
SYSL	A PC element that measures PM system load.

REFERENCES

Following is a list of references used throughout this document.

1. NABU-DP-00014-GEN, Rev. 2, "Design Process for Common Q Safety Systems," Westinghouse Electric Company LLC.
2. WNA-PS-00016-GEN, Rev. 5, "Standard Acronyms and Definitions," Westinghouse Electric Company LLC.
3. NABU-DS-00115-GEN, Rev. 0, "Safety System Standard Definitions," Westinghouse Electric Company LLC.
4. 00000-ICE-3889, Rev. 12, "Coding Standards and Guidelines for Common Q Systems," Westinghouse Electric Company LLC.
5. WCAP-16096-NP-A, Rev. 1A, "Software Program Manual for Common Q Systems," Westinghouse Electric Company LLC.
6. WCAP-16097-P-A, Rev. 0, "Common Qualified Platform Topical Report," Westinghouse Electric Company LLC.
7. 00000-ICE-30155, Rev. 9, "System Requirements Specification for the Common Q Generic Flat Panel Display," Westinghouse Electric Company LLC.
8. WNA-DS-01070-GEN, Rev. 5, "Application Restrictions for Generic Common Q Qualification," Westinghouse Electric Company LLC.
9. 00000-ICE-3239, Rev. 13, "Software Requirements Specification for the Common Q Generic Flat Panel Display Software," Westinghouse Electric Company LLC.
10. NABU-DP-00015-GEN, Rev. 3, "Common Q Software Configuration Management Guidelines," Westinghouse Electric Company LLC.
11. 00000-ICE-30157, Rev. 18, "Software Design Description for the Common Q Generic Flat-Panel Display Software," Westinghouse Electric Company LLC.
12. WNA-DS-00315-GEN, Rev. 2, "Reusable Software Element Document CRC for Calibration Data," Westinghouse Electric Company LLC.
13. WNA-DS-01150-GEN, Rev. 0, "Standard General Requirements for Cyber Security," Westinghouse Electric Company LLC.
14. AN03007Sp, ABB Memo, "AC160 CPU Loading Restrictions," ABB Process Automation Corporation.

REFERENCES (Cont'd)

15. 00000-ICE-30156, Rev. 8, "System Requirements Specification for the Common Q Post Accident Monitoring System," Westinghouse Electric Company LLC.
16. WNA-PD-00073-WBT, Rev. 0, "Project Plan Common Q Post Accident Monitoring System," Westinghouse Electric Company LLC.
17. WNA-DS-01617-WBT-P, Rev. 4, "Watts Bar 2 NSSS Completion Program I&C Projects Post Accident Monitoring System – System Requirements Specification," Westinghouse Electric Company.
18. 00000-ICE-3238, Rev. 5, "Software Requirements Specification Post Accident Monitoring System," Westinghouse Electric Company LLC.
19. WNA-CD-00018-GEN, Rev. 3, "Commercial Dedication Report for QNX 4.25G for Common Q Applications," Westinghouse Electric Company LLC.
20. WNA-IP-00152-GEN, Rev. 8, "Generic Common Q Software Installation Procedure," Westinghouse Electric Company LLC.
21. WNA-DS-01667-WBT-P, Rev. 4, "Watts Bar 2 NSSS Completion Program I&C Projects Post Accident Monitoring System – System Design Specification," Westinghouse Electric Company LLC.
22. 00000-ICE-30152, Rev. 5, "Software Design Description Post Accident Monitoring System AC160 Station," Westinghouse Electric Company LLC.
23. 00000-ICE-30140, Rev. 4, "Software Design Description for the Common Q Core Protection Calculator System Database and Utility Functions," Westinghouse Electric Company LLC.
24. 3BDS 005 665R401, Rev. A, "Data Base Elements, Advant Controller 160, Version 1.3 Reference Manual," ABB, Asea Brown Boveri.
25. 3BDS 005 666R101, Rev. C, "PC Elements Advant Controller 160, Version 1.3, Reference Manual," ABB, Asea Brown Boveri.
26. ANSI/IEEE Standard 754-1985, "IEEE Standard for Binary Floating-Point Arithmetic," Institute of Electrical and Electronics Engineers, Inc., 1985.
27. WNA-DS-01715-GEN, Rev. 4, "Standard Reusable Software Element Document for PM Diagnostics Type Circuit," Westinghouse Electric Company LLC.

REFERENCES (Cont'd)

28. WNA-CD-00029-GEN, Rev. 1, "Commercial Grade Dedication Report for the ABB Advant PM646A/PM646B Firmware/Base System Software Version 1.3/8, ACC Advanced Version 1.7/1 AC160 PC and DB Element Library Version 1.5/1 for Common Q Applications," Westinghouse Electric Company LLC.
29. WNA-DS-01564-GEN, Rev. 2, "Standard Reusable Software Element Document for Exclusive Module Error Type Circuit," Westinghouse Electric Company LLC.
30. 00000-ICE-37727, Rev. 0, "Post Accident Monitoring System Software Preliminary Hazard Analysis for the Common Q Phase 3 PAMS Project," Westinghouse Electric Company LLC.
31. WNA-DS-01838-GEN, Rev. 3, "Standard Reusable Software Element Document for Fourth-Order Polynomial Fluid Density Curve Fit Custom PC Element," Westinghouse Electric Company LLC.
32. WNA-DS-01839-GEN, Rev. 4, "Standard Reusable Software Element Document for Summation of Reference Leg Density Correction Custom PC Element," Westinghouse Electric Company LLC.
33. WNA-DS-01840-GEN, Rev. 2, "Standard Reusable Software Element Document for 2-Input Maximum Comparison with Status Control Custom PC Element," Westinghouse Electric Company LLC.
34. WNA-DS-01841-GEN, Rev. 2, "Standard Reusable Software Element Document for 2-Input Minimum Comparison with Status Control Custom PC Element," Westinghouse Electric Company LLC.
35. WNA-DS-01842-GEN, Rev. 4, "Standard Reusable Software Element Document for RVLIS Static Level Calculation Custom PC Element," Westinghouse Electric Company LLC.
36. WNA-DS-01845-GEN, Rev. 6, "Standard Reusable Software Element Document for Dynamic Head Compensation Calculation Custom PC Element," Westinghouse Electric Company LLC.
37. WNA-DS-01846-GEN, Rev. 2, "Standard Reusable Software Element Document for Normalized Dynamic Head Compensation Custom PC Element," Westinghouse Electric Company LLC.
38. WNA-DS-01847-GEN, Rev. 2, "Standard Reusable Software Element Document for Void Fraction Custom PC Element," Westinghouse Electric Company LLC.
39. WNA-DS-01848-GEN, Rev. 4, "Standard Reusable Software Element Document for the Reactor Vessel Level Monitoring Custom PC Element," Westinghouse Electric Company LLC.
40. WNA-DS-01849-GEN, Rev. 2, "Standard Reusable Software Element Document for the Reactor Coolant Pump Status Custom PC Element," Westinghouse Electric Company LLC.

REFERENCES (Cont'd)

41. WNA-DS-01994-GEN, Rev. 0, "Standard Reusable Software Element Document for a First Order Lag Filter Custom PC Element," Westinghouse Electric Company LLC.
42. WNA-DS-00306-GEN, Rev. 5, "Reusable Software Element Document Engineering Units Conversion," Westinghouse Electric Company LLC.
43. WNA-DS-02065-GEN, Rev. 2, "Standard Reusable Software Element Document for Reactor Vessel Level Alarm Custom PC Element," Westinghouse Electric Company LLC.
44. WNA-DS-01505-GEN, Rev. 0, "Standard Reusable Software Element Document for Reflash Type Circuit," Westinghouse Electric Company LLC.

REQUIREMENTS

Design and/or other requirements have been identified in this document. Following is a list of the requirement numbers and the document page on which the requirement is identified.

R2.3-1	2-3	R3.3-2	3-4
R2.3-2	2-3	R3.3-3	3-4
R2.3-3	2-3	R3.3-4	3-4
R2.3-4	2-3	R3.4-1	3-4
R2.3-5	2-3	R3.4-2	3-4
R2.3.1.1-1	2-3	R4.2-1	4-1
R2.3.1.1-2	2-4	R4.2-2	4-1
R2.3.1.2-1	2-4	R4.2-3	4-1
R2.3.1.3-1	2-4	R4.2-4	4-1
R2.3.1.4-1	2-5	R4.2-5	4-2
R2.3.2-1	2-5	R4.2-6	4-2
R2.3.2-2	2-5	R4.2-7	4-2
R2.3.2-3	2-5	R4.2-8	4-2
R2.3.2-4	2-5	R4.2-9	4-2
R2.3.2-5	2-5	R4.2-10	4-3
R2.3.2-6	2-6	R4.2-11	4-3
R2.3.2-7	2-6	R4.2-12	4-3
R2.3.2-8	2-6	R4.2-13	4-3
R2.3.2-9	2-6	R4.3.1-1	4-4
R2.3.2-10	2-6	R4.3.1-2	4-4
R2.3.2-11	2-6	R4.3.1-3	4-4
R2.3.2-12	2-6	R4.3.1-4	4-4
R2.3.2-13	2-6	R4.3.1-5	4-4
R2.3.2-14	2-7	R4.3.1-6	4-4
R2.3.2-15	2-7	R4.3.1-7	4-4
R2.3.2-16	2-7	R4.3.1-8	4-5
R2.3.2-17	2-7	R4.3.1-9	4-5
R3.1-1	3-1	R5.1-1	5-1
R3.1-2	3-1	R5.1-2	5-1
R3.1-3	3-1	R5.1-3	5-1
R3.1-4	3-1	R5.1.1-1	5-1
R3.2-1	3-2	R5.1.1-2	5-1
R3.2-2	3-2	R5.1.1-3	5-2
R3.2-3	3-2	R5.1.1-4	5-2
R3.2-4	3-2	R5.1.1-5	5-2
R3.2-5	3-2	R5.1.1-6	5-2
R3.2-6	3-3	R5.2.1-1	5-4
R3.2-7	3-3	R5.2.2-1	5-4
R3.2-8	3-3	R5.2.2-2	5-5
R3.2-9	3-3	R5.2.2-3	5-5
R3.3-1	3-3	R5.2.2-4	5-5

R5.2.3-1	5-5	R5.3.14-1	5-14
R5.2.3-2	5-5	R5.3.14-2	5-15
R5.2.3-3	5-6	R5.3.14-3	5-15
R5.2.4-1	5-6	R5.3.15-1	5-15
R5.2.4-2	5-6	R5.3.15-2	5-15
R5.2.4-3	5-6	R5.3.15-3	5-15
R5.3-1	5-6	R5.3.16-1	5-15
R5.3-2	5-6	R5.3.16-2	5-16
R5.3-3	5-7	R5.3.17-1	5-16
R5.3-4	5-7	R5.3.17-2	5-16
R5.3-5	5-7	R5.3.18-1	5-16
R5.3-6	5-7	R5.3.18-2	5-16
R5.3-7	5-7	R5.3.18-3	5-16
R5.3-8	5-7	R5.3.19-1	5-17
R5.3-9	5-7	R5.3.20-1	5-17
R5.3-10	5-8	R5.3.20-2	5-17
R5.3.1-1	5-8	R5.3.20-3	5-17
R5.3.1-2	5-8	R5.3.20-4	5-17
R5.3.1-3	5-8	R5.3.20-5	5-17
R5.3.1-4	5-8	R5.3.20-6	5-17
R5.3.2-1	5-9	R5.3.21-1	5-18
R5.3.2-2	5-9	R5.3.21-2	5-18
R5.3.2-3	5-9	R5.3.22-1	5-18
R5.3.3-1	5-9	R5.3.22-2	5-18
R5.3.3-2	5-9	R5.3.22-3	5-18
R5.3.3-3	5-10	R5.3.22-4	5-18
R5.3.3-4	5-10	R5.3.23-1	5-19
R5.3.4-1	5-10	R5.3.23-2	5-19
R5.3.4-2	5-10	R5.3.24-1	5-19
R5.3.4-3	5-10	R5.3.24-2	5-19
R5.3.4-4	5-11	R5.3.24-3	5-19
R5.3.5-1	5-11	R5.3.25-1	5-20
R5.3.5-2	5-11	R5.4.1-1	5-22
R5.3.6-1	5-11	R5.4.1-2	5-22
R5.3.6-2	5-11	R5.4.1-3	5-22
R5.3.7-1	5-12	R5.4.1-4	5-22
R5.3.7-2	5-12	R5.4.1-5	5-22
R5.3.8-1	5-12	R5.4.1-6	5-22
R5.3.8-2	5-12	R5.4.1-7	5-23
R5.3.9-1	5-12	R5.4.1-8	5-23
R5.3.9-2	5-13	R5.4.1-9	5-23
R5.3.10-1	5-13	R5.4.2-1	5-23
R5.3.10-2	5-13	R5.4.2-2	5-24
R5.3.11-1	5-14	R5.4.3-1	5-24
R5.3.11-2	5-14	R5.4.3-2	5-24
R5.3.11-3	5-14	R5.4.3-3	5-24

R5.4.3-4	5-25	R7.1.4.1-5	7-5
R5.4.3-5	5-25	R7.1.4.1-6	7-5
R5.4.3-6	5-25	R7.1.4.1-7	7-5
R5.4.3-7	5-25	R7.1.4.1-8	7-5
R5.4.3-8	5-25	R7.1.4.1-9	7-5
R5.4.6-1	5-26	R7.1.4.1-10	7-5
R5.4.6-2	5-26	R7.1.4.1-11	7-5
R5.4.6-3	5-26	R7.1.4.1-12	7-6
R5.4.7-1	5-26	R7.1.4.1-13	7-6
R5.5-1	5-28	R7.1.4.1-14	7-6
R5.5-2	5-29	R7.1.4.2-1	7-6
R5.5-3	5-29	R7.1.4.2-2	7-6
R5.5-4	5-29	R7.1.4.2-3	7-6
R5.5-5	5-29	R7.1.4.2-4	7-7
R5.5-6	5-30	R7.1.4.2-5	7-7
R5.5-7	5-30	R7.1.4.2-6	7-7
R5.5-8	5-30	R7.1.4.3-1	7-7
R5.5-9	5-30	R7.1.4.3-2	7-7
R5.5-10	5-30	R7.1.4.3-3	7-7
R5.5-11	5-30	R7.1.4.3-4	7-7
R5.5-12	5-31	R7.1.4.3-5	7-8
R6.1.2-1	6-1	R7.1.4.3-6	7-11
R6.1.2-2	6-2	R7.1.4.3-7	7-11
R6.1.2-3	6-2	R7.1.4.3-8	7-11
R6.1.2-4	6-2	R7.1.4.3-9	7-11
R6.1.2-5	6-2	R7.1.4.3-10	7-12
R6.1.2-6	6-2	R7.1.4.3-11	7-12
R6.1.2-7	6-3	R7.1.4.3-12	7-12
R6.2-1	6-3	R7.1.4.3-13	7-12
R6.2-2	6-3	R7.1.4.3-14	7-13
R6.2-3	6-3	R7.1.4.3-15	7-13
R6.2-4	6-3	R7.1.4.3-16	7-13
R6.2-5	6-4	R7.1.4.3-17	7-13
R6.2-6	6-4	R7.1.4.3-18	7-13
R6.2-7	6-4	R7.1.4.3-19	7-13
R6.2-8	6-4	R7.1.4.3-20	7-13
R7.1.2-1	7-1	R7.1.4.3-21	7-14
R7.1.3.1-1	7-3	R7.1.4.3-22	7-14
R7.1.3.1-2	7-3	R7.1.4.3-23	7-14
R7.1.3.3-1	7-3	R7.1.4.3-24	7-14
R7.1.3.3-2	7-4	R7.1.4.3-25	7-14
R7.1.3.3-3	7-4	R7.1.4.3-26	7-14
R7.1.4.1-1	7-4	R7.1.4.3-27	7-15
R7.1.4.1-2	7-4	R7.1.4.3-28	7-15
R7.1.4.1-3	7-4	R7.1.4.3-29	7-15
R7.1.4.1-4	7-5	R7.1.4.3-30	7-15

R7.1.4.3-31	7-15	R7.1.5.1-1	7-26
R7.1.4.3-32	7-16	R7.1.5.1-2	7-26
R7.1.4.3-33	7-16	R7.1.5.1-3	7-26
R7.1.4.3-34	7-16	R7.1.5.1-4	7-27
R7.1.4.3-35	7-16	R7.1.5.1-5	7-27
R7.1.4.3-36	7-17	R7.1.5.1-6	7-27
R7.1.4.3-37	7-17	R7.1.5.2-1	7-27
R7.1.4.3-38	7-17	R7.1.5.2-2	7-28
R7.1.4.3-39	7-17	R7.1.5.2-3	7-28
R7.1.4.3-40	7-17	R7.1.5.2-4	7-28
R7.1.4.3-41	7-17	R7.1.5.2-5	7-28
R7.1.4.3-42	7-17	R7.1.5.2-6	7-28
R7.1.4.3-43	7-18	R7.1.5.4-1	7-28
R7.1.4.3-44	7-18	R7.1.5.4-2	7-29
R7.1.4.3-45	7-18	R7.1.5.4-3	7-29
R7.1.4.3-46	7-18	R7.1.5.4-4	7-29
R7.1.4.3-47	7-18	R7.1.5.4-5	7-29
R7.1.4.3-48	7-18	R7.1.5.4-6	7-29
R7.1.4.3-49	7-18	R7.1.5.4-7	7-29
R7.1.4.3-50	7-19	R7.1.5.4-8	7-30
R7.1.4.3-51	7-19	R7.1.5.4-9	7-30
R7.1.4.3-52	7-19	R7.1.5.4-10	7-30
R7.1.4.3-53	7-19	R7.1.5.4-11	7-30
R7.1.4.4-1	7-19	R7.1.5.4-12	7-30
R7.1.4.4-2	7-20	R7.1.5.4-13	7-31
R7.1.4.4-3	7-20	R7.1.6-1	7-31
R7.1.4.4-4	7-20	R7.1.6-2	7-32
R7.1.4.4-5	7-20	R7.1.6-3	7-32
R7.1.4.4-6	7-20	R7.1.8-1	7-32
R7.1.4.4-7	7-20	R7.1.8-2	7-32
R7.1.4.4-8	7-20	R7.1.10-1	7-33
R7.1.4.4-9	7-21	R7.1.10-2	7-33
R7.1.4.4-10	7-21	R7.1.11-1	7-33
R7.1.4.4-11	7-21	R7.1.12-1	7-33
R7.1.4.4-12	7-21	R7.1.13-1	7-33
R7.1.4.5-1	7-21	R7.1.14-1	7-34
R7.1.4.6-1	7-22	R7.1.15-1	7-34
R7.1.4.6-2	7-22	R7.1.16-1	7-34
R7.1.4.6-3	7-23	R7.1.17-1	7-34
R7.1.4.6-4	7-23	R7.1.24-1	7-35
R7.1.4.6-5	7-23	R7.2.2-1	7-36
R7.1.4.6-6	7-23	R7.2.2-2	7-38
R7.1.4.6-7	7-24	R7.2.2-3	7-38
R7.1.4.6-8	7-24	R7.2.2-4	7-38
R7.1.4.7-1	7-26	R7.2.2-5	7-38
R7.1.4.7-2	7-26	R7.2.2-6	7-38

R7.2.2-7	7-38	R7.2.11-2	7-46
R7.2.2-8	7-39	R7.2.11-3	7-46
R7.2.2-9	7-39	R7.2.11-4	7-46
R7.2.2-10	7-39	R7.2.11-5	7-46
R7.2.2-11	7-39	R7.2.11-6	7-47
R7.2.2-12	7-39	R7.2.11-7	7-47
R7.2.2-13	7-39	R7.2.12-1	7-47
R7.2.2-14	7-39	R7.2.12-2	7-47
R7.2.2-15	7-39	R7.2.12-3	7-47
R7.2.2-16	7-40	R7.2.12-4	7-47
R7.2.3-1	7-40	R7.2.12-5	7-47
R7.2.3-2	7-40	R7.2.12-6	7-48
R7.2.4-1	7-40	R7.2.12-7	7-48
R7.2.4-2	7-40	R7.2.12-8	7-48
R7.2.4-3	7-41	R7.2.12-9	7-48
R7.2.4-4	7-41	R7.2.13-1	7-48
R7.2.4-5	7-41	R7.2.13-2	7-48
R7.2.4-6	7-41	R7.2.13-3	7-48
R7.2.4-7	7-41	R7.2.13-4	7-49
R7.2.4-8	7-41	R7.2.13-5	7-49
R7.2.4-9	7-41	R7.2.13-6	7-49
R7.2.4-10	7-41	R7.2.13-7	7-49
R7.2.5-1	7-42	R7.2.13-8	7-49
R7.2.5-2	7-42	R7.2.13-9	7-50
R7.2.6-1	7-42	R7.2.13-10	7-50
R7.2.6-2	7-42	R7.2.13-11	7-50
R7.2.7-1	7-42	R7.2.13-12	7-50
R7.2.7-2	7-43	R7.2.13-13	7-50
R7.2.7-3	7-43	R7.2.13-14	7-50
R7.2.7-4	7-43	R7.2.13-15	7-50
R7.2.7-5	7-43	R7.2.13-16	7-50
R7.2.7-6	7-43	R7.2.13-17	7-51
R7.2.7-7	7-43	R7.2.13-18	7-51
R7.2.7-8	7-44	R7.2.13-19	7-51
R7.2.8-1	7-44	R7.2.13-20	7-51
R7.2.8-2	7-44	R7.2.13-21	7-51
R7.2.8-3	7-44	R7.2.13-22	7-51
R7.2.8-4	7-44	R7.2.14-1	7-52
R7.2.8-5	7-44	R7.2.14-2	7-52
R7.2.8-6	7-44	R7.2.14-3	7-52
R7.2.9-1	7-45	R7.2.14-4	7-52
R7.2.9-2	7-45	R7.2.14-5	7-52
R7.2.9-3	7-45	R7.2.14-6	7-53
R7.2.10-1	7-45	R7.2.15-1	7-53
R7.2.10-2	7-45	R7.2.15-2	7-53
R7.2.11-1	7-46	R7.2.16-1	7-53

**Nuclear Automation
Watts Bar Unit 2 NSSS Completion Program I&C Projects**

**Software Requirements Specification for the
Post Accident Monitoring System**

R7.2.16-2	7-53	R7.2.23-5	7-60
R7.2.16-3	7-53	R7.2.24-1	7-60
R7.2.16-4	7-54	R7.2.24-2	7-60
R7.2.16-5	7-54	R7.2.24-3	7-60
R7.2.16-6	7-54	R7.2.24-4	7-60
R7.2.16-7	7-54	R7.2.25-1	7-60
R7.2.17-1	7-54	R7.2.25-2	7-61
R7.2.17-2	7-54	R7.2.25-3	7-61
R7.2.17-3	7-55	R7.2.25-4	7-61
R7.2.17-4	7-55	R7.2.25-5	7-61
R7.2.17-5	7-55	R7.2.25-6	7-61
R7.2.17-6	7-55	R7.2.25-7	7-61
R7.2.17-7	7-55	R7.2.25-8	7-61
R7.2.17-8	7-55	R7.2.26-1	7-61
R7.2.17-9	7-55	R7.2.26-2	7-62
R7.2.17-10	7-55	R7.2.26-3	7-62
R7.2.17-11	7-56	R7.2.26-4	7-62
R7.2.18-1	7-56	R7.2.26-5	7-62
R7.2.18-2	7-56	R7.2.27-1	7-62
R7.2.18-3	7-56	R7.2.27-2	7-62
R7.2.18-4	7-56	R7.2.27-3	7-62
R7.2.18-5	7-56	R7.2.27-4	7-63
R7.2.18-6	7-56	R7.2.27-5	7-63
R7.2.19-1	7-57	R7.2.27-6	7-63
R7.2.19-2	7-57	R7.2.27-7	7-63
R7.2.19-3	7-57	R7.2.27-8	7-63
R7.2.19-4	7-57	R7.2.28-1	7-63
R7.2.20-1	7-57	R7.2.28-2	7-63
R7.2.20-2	7-57	R7.2.28-3	7-64
R7.2.20-3	7-57	R7.2.28-4	7-64
R7.2.20-4	7-58	R7.2.28-5	7-64
R7.2.20-5	7-58	R7.2.28-6	7-64
R7.2.20-6	7-58	R7.2.28-7	7-64
R7.2.21-1	7-58	R7.2.29-1	7-65
R7.2.21-2	7-58	R7.2.29-2	7-65
R7.2.21-3	7-58	R7.2.29-3	7-65
R7.2.21-4	7-58	R7.2.29-4	7-65
R7.2.22-1	7-59	R7.2.30-1	7-65
R7.2.22-2	7-59	R7.2.30-2	7-65
R7.2.22-3	7-59	R7.2.30-3	7-65
R7.2.22-4	7-59	R7.2.30-4	7-66
R7.2.22-5	7-59	R7.2.30-5	7-66
R7.2.23-1	7-59	R7.2.30-6	7-66
R7.2.23-2	7-59	R7.2.31-1	7-66
R7.2.23-3	7-59	R7.2.31-2	7-66
R7.2.23-4	7-60	R7.2.31-3	7-66

R7.2.31-4	7-67	R7.2.42-3	7-82
R7.2.32-1	7-67	R7.2.43-1	7-82
R7.2.32-2	7-67	R7.2.44-1	7-82
R7.2.32-3	7-67	R7.2.44-2	7-82
R7.2.32-4	7-67	R7.2.44-3	7-83
R7.2.33-1	7-67	R7.2.44-4	7-83
R7.2.33-2	7-68	R7.2.44-5	7-83
R7.2.33-3	7-68	R7.2.45-1	7-84
R7.2.33-4	7-68	R7.2.46-1	7-84
R7.2.33-5	7-68	R7.2.47-1	7-84
R7.2.34-1	7-68	R7.2.47-2	7-84
R7.2.34-2	7-68	R7.2.48-1	7-84
R7.2.34-3	7-68	R7.2.49-1	7-85
R7.2.34-4	7-68	R7.2.57-1	7-86
R7.2.34-5	7-69	R7.2.57-2	7-86
R7.2.34-6	7-77	R7.2.57-3	7-86
R7.2.34-7	7-77	R7.2.57-4	7-87
R7.2.34-8	7-77	R7.2.57-5	7-87
R7.2.34-9	7-77	R7.2.57-6	7-87
R7.2.34-10	7-77	R8.2.1-1	8-1
R7.2.34-11	7-77	R8.2.1-2	8-1
R7.2.34-12	7-77	R8.2.1-3	8-2
R7.2.35-1	7-78	R8.2.1-4	8-2
R7.2.35-2	7-78	R8.2.1-5	8-2
R7.2.35-3	7-78	R8.2.1-6	8-2
R7.2.35-4	7-78	R8.2.1-7	8-2
R7.2.35-5	7-78	R8.2.1-8	8-2
R7.2.36-1	7-78	R8.2.1-9	8-2
R7.2.36-2	7-79	R8.2.1-10	8-2
R7.2.36-3	7-79	R8.2.1-11	8-2
R7.2.36-4	7-79	R8.2.1-12	8-3
R7.2.37-1	7-79	R8.2.1-13	8-3
R7.2.37-2	7-79	R8.2.1-14	8-3
R7.2.37-3	7-79	R8.2.1-15	8-3
R7.2.38-1	7-80		
R7.2.40-1	7-80		
R7.2.40-2	7-80		
R7.2.40-3	7-80		
R7.2.40-4	7-80		
R7.2.40-5	7-81		
R7.2.40-6	7-81		
R7.2.41-1	7-81		
R7.2.41-2	7-81		
R7.2.41-3	7-81		
R7.2.42-1	7-81		
R7.2.42-2	7-82		

(Last Page of Front Matter)

SECTION 1 INTRODUCTION

1.1 OVERVIEW

This document describes requirements for the major software components, design structure, information flow, processing steps, and other required aspects that are to be implemented to satisfy the Watts Bar Unit 2 Post Accident Monitoring System (PAMS) functional and system requirements. This document also describes requirements that are needed to provide software standardization, meet licensing requirements, and reduce the possibility of software coding errors.

The primary functions of the PAMS are listed in Section 2.1. The major software components consist of the AC160 safety algorithms (Saturation Margin Monitoring, Core Exit Thermocouples Monitoring, and Reactor Vessel Level Monitoring), the AC160 communications, the AC160 test and maintenance functions, the OM and MTP graphical display program, the OM and MTP communications programs, and the OM and MTP test and maintenance functions.

The Watts Bar Unit 2 PAMS software is implemented on the Common Qualified (Q) platform. The Advant[®] Controller 160 (AC160) platform is described in WCAP-16097-P-A, "Common Qualified Platform Topical Report" (Reference 6). The platform consists of two major products: the Asea Brown Boveri (ABB) AC160 platform and the Flat Panel Display System (FPDS) platform.

The AC160 platform software consists of the AC160 controller operating system (Base) software, the AC160 application programming tool (ACC 1.7/1 Advanced), and the AC160 application software. The AC160 Base software and application programming tool were developed by ABB Industrial Systems and are qualified per the requirements of WCAP-16096-NP-A, "Software Program Manual for Common Q Systems" (Reference 5). The AC160 application software development should be compliant with the following documents: WCAP-16097-P-A, "Common Qualified Platform Topical Report" (Reference 6), WCAP-16096, Software Program Manual for Common Q Systems (Reference 5), NABU-DP-00014-GEN, "Design Process for Common Q Safety Systems" (Reference 1), and WNA-DS-01070-GEN, "Application Restrictions for Generic Common Q Qualification" (Reference 8) (see exceptions in R2.3-3).

The FPDS consists of the qualified QNX[®] operating system, the qualified QNX development environment (includes the Watcom[™] compiler and linker), the Westinghouse FPDS generic software (e.g., Westinghouse-developed display widgets and programs), and the application-specific FPDS software developed to meet Watts Bar 2 PAMS-specific requirements. The Westinghouse FPDS generic software has undergone a qualification program to verify the requirements of 00000-ICE-3239, "Software Requirements Specification for the Common Q Generic Flat-Panel Display Software" (Reference 9).

00000-ICE-3889, "Coding Standards and Guidelines for Common Q Systems" (Reference 4) identifies additional programming standards and guidelines to be used for the application software.

1.2 SCOPE

This document defines the software requirements for the Watts Bar 2 PAMS-specific application software for both the AC160 and the FPDS.

1.3 OBJECTIVE

This document provides documentation for the requirements used in the design of the Watts Bar 2 PAMS software in accordance with NABU-DP-00014-GEN, "Design Process for Common Q Safety Systems" (Reference 1).

1.4 BACKGROUND

The software requirements for the Watts Bar 2 PAMS defined herein are based on 00000-ICE-3238, "Software Requirements Specification for the Common Q Post Accident Monitoring System" (Reference 18), and changes defined in WNA-DS-01617-WBT-P, "Post Accident Monitoring System – System Requirements Specification" (Reference 17). The specific sections of 00000-ICE-3238 that apply to the Watts Bar 2 PAMS are identified throughout this document. The Watts Bar 2 PAMS reactor vessel level monitoring system will use a Westinghouse Reactor Vessel Level Instrumentation System (RVLIS) in place of the Heated Junction Thermocouple (HJTC) system.

(Last Page of Section 1)

SECTION 2 GENERAL DESCRIPTION

2.1 FUNCTIONAL DESCRIPTION

Watts Bar 2 PAMS, a real-time monitoring system, provides:

- Information and alarms to assist the reactor operators in mitigating plant events or accidents that have the potential to result in inadequate cooling of the reactor core
- Information and data to the plant monitoring/safety parameter display system (SPDS) computers for use in its control room display

The Watts Bar 2 PAMS will be composed of two separate and independent redundant trains. Each of the two redundant trains will be capable of performing all of the required PAMS functions, even if the other redundant train is out of service. The overall system availability will comply with the requirements specified in WNA-DS-01617-WBT-P (Reference 17). The PAMS provides two types of indications for alarms. The FPDS provides one source of alarm indication, and the AC160 digital outputs to the plant annunciators provide the other alarm indication.

The PAMS measures process input signals, and calculates the inadequate core cooling (ICC) functions of:

- Core Exit Temperature
- Subcooled Margin
- Reactor Vessel Level

and provides the following outputs:

- Plant Computer System
- Annunciator
- Analog Outputs

The PAMS includes an Operator's Module (OM) located at the control room that provides a graphic, man-machine interface for the display of PAMS' information. The functions of the OM include:

- Display of:
 - Core Exit Thermocouples (CETs) and CET Monitoring calculation results
 - Reactor Vessel Level calculation results
 - Reactor Coolant System (RCS) process variables and Subcooled Margin calculation results
 - System diagnostic information
 - Lists of alarm and failed values

- Alarming of:
 - High CET values and CET Monitoring calculation results
 - Low RVLIS reactor coolant level calculation results
 - High RCS values and Subcooled Margin calculation results
- Maintenance functions for:
 - Changing setpoints
 - Bypassing sensors

PAMS also includes a Maintenance and Test Panel (MTP) local to the PAMS cabinet that includes all the OM functions plus the following maintenance functions:

- On-line surveillance of PAMS operation
- Off-line loading of AC160 application software
- Off-line interrogation of the error buffer in the AC160

PAMS has two manual key lock switch inputs, which are administratively controlled. The *Function Enable* (FE) keyswitch enables the OM or MTP to bypass variables and change alarm setpoints, and the MTP to enable surveillance checks on the annunciator outputs. When the keyswitch is in the "ENABLE" position, the System Trouble annunciator will be activated.

The *Software Load Enable* (SLE) keyswitch enables the MTP to enter the off-line mode. This is accomplished via a button on the maintenance display that resets the MTP, boots the Microsoft® Windows® operating system, and starts the software development environment. In the off-line mode, configuration software can be downloaded to the AC160, and the error buffer in the AC160 can be interrogated.

2.2 SYSTEM ARCHITECTURE DESCRIPTION

The Watts Bar 2 PAMS architecture is described in WNA-DS-01667-WBT-P, "Watts Bar 2 NSSS Completion Program I&C Projects Post Accident Monitoring System – System Design Specification" (Reference 21).

The PAMS architecture will consist of two redundant trains of identical equipment. Each train consists of one AC160 station containing a single PM646A processor and multiple input/output (I/O) modules. An MTP is also included with the AC160 in the same cabinet. Additionally, each train has an OM that is located in the control room.

2.3 GENERAL CONSTRAINTS

The PAMS software will comply with the requirements and guidelines defined in WCAP-16096-NP-A, "Software Program Manual for Common Q Systems" (Reference 5) and the requirements and guidelines defined in 00000-ICE-3889, "Coding Standards and Guidelines for Common Q Systems" (Reference 4).

R2.3-1

[The PAMS software shall include functional testing and system self-testing features as defined in WNA-DS-01617-WBT-P (Reference 17).]

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.3.3-1, R2.6.3.3-1, R2.6.3.3-2, R2.6.3.3-3, R2.6.3.3-4, R2.6.3.3-5, R2.6.3.3-6, R2.6.3.3-7, and R3.3.1-1.

R2.3-2

[DELETED]

R2.3-3

[The PAMS software shall comply with the requirements and guidelines defined in WNA-DS-01070-GEN, "Application Restrictions for Generic Common Q Qualification" (Reference 8).]

Exception: WNA-DS-01070-GEN, S3a, shall be partially met (TIMESYNC shall be set to SLAVE).

Exception: WNA-DS-01070-GEN, S7, shall be partially met (MDAT_SV shall be set to NO).

Exception: WNA-DS-01070-GEN, S19, shall not be met (STDADD05 contains unused elements that are unqualified).

Rationale: WNA-DS-01070-GEN (Reference 8).

R2.3-4

[DELETED]

R2.3-5

[The AC160 custom PC elements shall be written in the C programming language.]

Rationale: WNA-DS-01070-GEN (Reference 8), S21.

2.3.1 Naming Conventions

The following section provides guidelines and requirements for naming conventions. It is the responsibility of the individual software designer to follow the naming convention guidelines to the degree that is consistent with the PAMS software design. The standard signal naming conventions to be used on the Watts Bar 2 PAMS will be consistent with the requirements in 00000-ICE-3889, "Coding Standards and Guidelines for Common Q Systems" (Reference 4). If other application-specific naming conventions are used, a detailed explanation will be documented in the subsystem requirement section of this document and the application-specific Software Design Description.

2.3.1.1 Node Names

R2.3.1.1-1

[The ABB Advant Master Programming Language (AMPL) node names and file names shall be defined per Tables 2.3-1 and 2.3-2.]

Rationale: 00000-ICE-3889 (Reference 4), Section 3.3.1.

R2.3.1.1-2

[The Bus, Station, and DSP Station numbers shall be defined per Tables 2.3-1 and 2.3-2.]

Rationale: 00000-ICE-3889 (Reference 4), Section 3.3.1.

Table 2.3-1. Train A AMPL Naming Conventions

Station Type	Processor Module (PM)	Node Name	Bus, Station	DSP Station Numbers	AAX File Name	BAX File Name
PAMS	PM1	PAMA	0,01	01,02	PAMA	PAMA
OM	N/A	OM	0,50	50,51	N/A	N/A
MTP	N/A	MTP	0,60	60,61	N/A	N/A

Table 2.3-2. Train B AMPL Naming Conventions

Station Type	Processor Module (PM)	Node Name	Bus, Station	DSP Station Numbers	AAX File Name	BAX File Name
PAMS	PM1	PAMB	0,01	01,02	PAMB	PAMB
OM	N/A	OM	0,50	50,51	N/A	N/A
MTP	N/A	MTP	0,60	60,61	N/A	N/A

2.3.1.2 AC160 PC Terminal Names

R2.3.1.2-1

[AC160 PC Terminal naming conventions shall be consistent with the requirements in 00000-ICE-3889, "Coding Standards and Guidelines for Common Q Systems" (Reference 4).]

Rationale: 00000-ICE-3889 (Reference 4), Section 3.3.1.

2.3.1.3 AC160 Communication Database (DB) Element Names

R2.3.1.3-1

[Communication DB Element (DSP and DAT) naming conventions shall be consistent with the requirements in 00000-ICE-3889, "Coding Standards and Guidelines for Common Q Systems" (Reference 4) for legacy systems.]

Rationale: 00000-ICE-3889 (Reference 4), Section 3.3.1.

2.3.1.4 AC160 I/O Names

R2.3.1.4-1

[The I/O channel instance names shall be derived from WNA-DS-01667-WBT-P (Reference 21).]

Rationale: WNA-DS-01667-WBT-P (Reference 21).

2.3.2 Configuration Control

The Watts Bar 2 PAMS software will comply with the configuration control requirements and guidelines defined in WCAP-16096-NP-A, "Software Program Manual for Common Q Systems" (Reference 5) and in NABU-DP-00015-GEN, "Common Q Software Configuration Management Guidelines" (Reference 10). AAX and BAX source files will contain the version and revision history information as described in NABU-DP-00015-GEN (Reference 10). For type circuits, the TCS source file will contain the version and revision history information as described in NABU-DP-00015-GEN (Reference 10).

R2.3.2-1

[DELETED]

R2.3.2-2

[The version of the qualified AC160 base software that is used in the Watts Bar 2 PAMS software shall be identified in each AC160 Software Release Record (SRR) that is issued for the project.]

Rationale: WNA-PD-00073-WBT (Reference 16), Section 16.8.1 to conform with project and standard configuration control requirements and 00000-ICE-3889 (Reference 4), Section 3.4.3

R2.3.2-3

[The version of the qualified AMPL Control Configuration (ACC) Advanced Tool that is used to develop the Watts Bar 2 PAMS software shall be identified in each AC160 SRR that is issued for the project.]

Rationale: WNA-PD-00073-WBT (Reference 16), Section 16.8.1 to conform with project and standard configuration control requirements.

R2.3.2-4

[The version of the qualified Advant Application Builder that is used to develop the Watts Bar 2 PAMS software shall be identified in each AC160 SRR that is issued for the project.]

Rationale: WNA-PD-00073-WBT (Reference 16), Section 16.8.1 to conform with project and standard configuration control requirements.

R2.3.2-5

[The version of the qualified Advant Function Chart Builder (FCB) that is used to develop the Watts Bar 2 PAMS software shall be identified in each AC160 SRR that is issued for the project.]

Rationale: WNA-PD-00073-WBT (Reference 16), Section 16.8.1 to conform with project and standard configuration control requirements.

R2.3.2-6

[The version of the standard FCB PC and DB elements library shall be identified in each AC160 SRR that is issued for the project.]

Rationale: WNA-PD-00073-WBT (Reference 16), Section 16.8.1 to conform with project and standard configuration control requirements.

R2.3.2-7

[The version of any option loaded in the AC160 processor module shall be identified in each AC160 SRR that is issued for the project.]

Rationale: WNA-PD-00073-WBT (Reference 16), Section 16.8.1 to conform with project and standard configuration control requirements.

R2.3.2-8

[The System (base software/options) Cyclic Redundancy Check (CRC) value shall be identified in each AC160 application SRR that is issued for the project.]

Rationale: WNA-PD-00073-WBT (Reference 16), Section 16.8.1 to conform with project and standard configuration control requirements.

R2.3.2-9

[The application CRC value shall be identified in each AC160 application SRR that is issued for the project.]

Rationale: WNA-PD-00073-WBT (Reference 16), Section 16.8.1 to conform with project and standard configuration control requirements.

R2.3.2-10

[DELETED]

R2.3.2-11

[DELETED]

R2.3.2-12

[The date in the FCB document footer shall be the date that the node PC section (AAX) and/or DB section (BAX) were last changed.]

Rationale: WNA-PD-00073-WBT (Reference 16), Section 16.8.1 to conform with project and standard configuration control requirements.

R2.3.2-13

[The application program AMPL directory shall be kept under configuration control in the Visual SourceSafe® library as described in 00000-ICE-3889 (Reference 4).]

Rationale: 00000-ICE-3889 (Reference 4), Section 3.3.7.

R2.3.2-14

[The version of the qualified FPDS QNX operating system that is used in the Watts Bar 2 PAMS software shall be identified in each FPDS SRR that is issued for the project.]

Rationale: WNA-PD-00073-WBT (Reference 16), Section 16.8.1 to conform with project and standard configuration control requirements.

R2.3.2-15

[The FPDS application programs for the OM and MTP shall be kept under configuration control in the CQRev source code control system as described in 00000-ICE-3889 (Reference 4).]

Rationale: 00000-ICE-3889 (Reference 4), Section 3.3.7.

R2.3.2-16

[The version of the generic flat panel display (FPD) software as described in 00000-ICE-30157, "Software Design Description for the Common Q Generic Flat-Panel Software" (Reference 11) that is used to develop the Watts Bar 2 PAMS software shall be identified in each FPD SRR that is issued for the project.]

Rationale: WNA-PD-00073-WBT (Reference 16), Section 16.8.1 to conform with project and standard configuration control requirements.

R2.3.2-17

[The FPD-calculated checksum value(s) shall be identified in each FPD SRR that is issued for the project.]

Guidance: At a minimum, the SRR should include the on-line checksums for each of the project-specific binaries files. These on-line checksums are generated using the *calcsun* program described in 00000-ICE-30157 (Reference 11), subsection 5.5.23.

Rationale: WNA-PD-00073-WBT (Reference 16), Section 16.8.1 to conform with project and standard configuration control requirements.

(Last Page of Section 2)

SECTION 3 STANDARD SOFTWARE DESCRIPTION

3.1 AC160 BASE SYSTEM SOFTWARE

The AC160 processor operating system software consists of the standard AC160 family of system software products developed by ABB Industrial Systems. The AC160 system software resides in the AC160 Central Processing Unit (CPU) module flash PROM (non-volatile memory). A general description of the AC160 system software is given in WCAP-16097-P-A, "Common Qualified Platform Topical Report" (Reference 6).

R3.1-1

[AC160 Base Software Version 1.3/8 shall be used for all processors.]

Guidance: This software version will be specified in the AC160 application SRR. WNA-CD-00029-GEN, "Commercial Grade Dedication Report for the ABB Advant PM646A/PM646B Firmware/Base System Software Version 1.3/8 for Common Q Applications" (Reference 28) provides guidance on the use of this software.

Rationale: This base software version is required for use with the AI687 and AI688 modules as described in WNA-CD-00029-GEN (Reference 28).

R3.1-2

[All PC or DB element restrictions documented in WNA-DS-01070-GEN (Reference 8) shall be followed.]

Exception: WNA-DS-01070-GEN, S3a, shall be partially met (TIMESYNC shall be set to SLAVE).

Exception: WNA-DS-01070-GEN, S7, shall be partially met (MDAT_SV shall be set to NO).

Exception: WNA-DS-01070-GEN, S19, shall not be met (STDADD05 contains unused elements that are unqualified).

Rationale: WNA-DS-01070-GEN (Reference 8).

R3.1-3

[Only the options needed for the application shall be loaded on the processors.]

Rationale: Engineering Judgment. To minimize memory usage and reduce system complexity.

R3.1-4

[The loading and reloading of options shall be performed in the order documented in the SRR of the processor module.]

Rationale: WNA-DS-01070-GEN (Reference 8), S23. Loading options in different orders will result in different system CRC values.

3.2 AC160 APPLICATION SOFTWARE DEVELOPMENT

The ACC Advanced Tool, for configuration and programming software, is used in the generation of the Watts Bar 2 PAMS AC160 software. The ACC Advanced Tool consists of Application Builder and FCB. The ACC Advanced Tool also requires a library of standard PC and DB elements.

R3.2-1

[ABB ACC Advanced Tool Version 1.7/1 shall be used in all Watts Bar 2 PAMS software development workstations.]

Guidance: This software version will be specified in the AC160 application SRR.

Rationale: This tool software version is required for use with the AI687 and AI688 modules as described in WNA-CD-00029-GEN (Reference 28).

R3.2-2

[The ACC Advanced Tool shall only be used on the designated Windows Operating System for which it is qualified.]

Guidance: It is acceptable for the development to be performed under a virtual environment such as VMware™.

Rationale: 00000-ICE-3889 (Reference 4), Section 3.1.

R3.2-3

[Application Builder Version (Version 2.7/1) shall be used in all Watts Bar 2 PAMS software development workstations.]

Guidance: This software version will be specified in the AC160 application SRR.

Rationale: This tool software version is required for use with the AI687 and AI688 modules as described in WNA-CD-00029-GEN (Reference 28).

R3.2-4

[FCB Version (Version 4.8/1) shall be used in all Watts Bar 2 PAMS software development workstations.]

Guidance: This software version will be specified in the AC160 application SRR.

Rationale: This tool software version is required for use with the AI687 and AI688 modules as described in WNA-CD-00029-GEN (Reference 28).

R3.2-5

[AMPL PC and DB element libraries shall be used in all Watts Bar 2 PAMS software development workstations.]

Guidance: This software version will be specified in the AC160 application SRR.

Rationale: Only these libraries are compatible and have been qualified for use with the AC160 platform as described in WNA-CD-00029-GEN (Reference 28).

R3.2-6

[The Page Layout Template for the printout of the node PC section (AAX) and DB section (BAX) programs shall be WEC US Letter Landscape English.]

Rationale: 00000-ICE-3889 (Reference 4), Section 3.3.8 and engineering judgment.

R3.2-7

[Type circuit design and implementation shall comply with the requirements and guidelines defined in 00000-ICE-3889 (Reference 4).]

Rationale: 00000-ICE-3889 (Reference 4).

R3.2-8

[Custom PC element design and implementation shall comply with the requirements and guidelines defined in 00000-ICE-3889 (Reference 4).]

Rationale: 00000-ICE-3889 (Reference 4).

R3.2-9

[The type circuits and custom PC elements that shall be used in Watts Bar 2 PAMS are given in the Table 7.1-1.]

Guidance: Standard type circuits will be developed and used wherever possible.

Rationale: The items in Table 7.1-1 are approved for use in Common Q systems and satisfy the functional requirements of the Watts Bar 2 PAMS.

3.3 FPDS APPLICATION SOFTWARE DEVELOPMENT ENVIRONMENT

The FPDS application software is programmed in C language and executes on the QNX operating system. The software is composed of standard QNX Photon[®] display components and software procedures; generic Common Q FPD display components, software procedures, and programs; and additional application software components that are implemented as needed to provide project-specific capabilities.

R3.3-1

[The FPDS software development environment shall match the environment described in Section 7.2, Table 1 and Section 7.3, Table 2 of WNA-CD-00018-GEN, "Commercial Dedication Report for QNX 4.25G for Common Q Applications" (Reference 19).]

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2-9.

R3.3-2

[The FPDS development environment shall be installed by following the steps defined in Section 2.4.4 of WNA-IP-00152-GEN, “Generic Common Q Software Installation Procedure” (Reference 20).]

Rationale: WNA-IP-00152-GEN (Reference 20), Section 2.4.4.

R3.3-3

[The Generic FPD library shall be installed prior to developing Common Q display applications in Photon by following the procedure in Appendix C of 00000-ICE-30157, “Software Design Description for the Common Q Generic Flat-Panel Display Software” (Reference 11).]

Rationale: 00000-ICE-30157 (Reference 11), Appendix C.

R3.3-4

[QNX application program design and implementation shall comply with the requirements and guidelines defined in 00000-ICE-3889, “Coding Standards and Guidelines for Common Q Systems” (Reference 4).]

Rationale: 00000-ICE-3889 (Reference 4).

3.4 FPDS APPLICATION SOFTWARE DEPLOYMENT

The FPDS application software will be deployed on a Class 1-E qualified FPD “nodebox” running the QNX operating system and QNX Photon graphical display system.

R3.4-1

[The FPDS runtime environment shall match the environment described in Section 7.2, Table 1 of WNA-CD-00018-GEN, “Commercial Dedication Report for QNX 4.25G for Common Q Applications” (Reference 19).]

Guidance: The applicable software versions will be specified in the SRR for Watts Bar 2 PAMS.

Rationale: WNA-CD-00018-GEN (Reference 19), Section 7.2, Table 2.

R3.4-2

[The FPDS runtime environment shall be installed by following the steps defined in Section 2.4.3 of WNA-IP-00152-GEN, “Generic Common Q Software Installation Procedure” (Reference 20).]

Exception: The name of the site-specific installation script will use the name “install-wbtpams” instead of “install_fpdsw” as recommended by this reference.

Rationale: WNA-IP-00152-GEN (Reference 20), Section 2.4.3.

(Last Page of Section 3)

SECTION 4 AC160 DATABASE CONFIGURATION

4.1 OVERVIEW

The AC160 database (DB section) defines the configuration parameters of the PM646A processor module, CI631 communication interface module, S600 series I/O modules/channels, and communication elements (DSP and DAT).

4.2 HARDWARE DB ELEMENT CONFIGURATION

R4.2-1

a,c

Rationale: This requirement provides consistency with WNA-DS-01070-GEN (Reference 8), Table 2-1 and 3BDS 005 665R401, "Data Base Elements, Advant Controller 160, Version 1.3 Reference Manual" (Reference 24), Page 326.

R4.2-2

[The Mode switch on the PM646 controller shall be set to the COLD START position (Position "1") except when loading base software or options.]

Guidance: This requirement ensures that the AC160 processor module will attempt to restart the application software upon power-up or reset conditions.

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.1-1 and R2.9.4-2.

R4.2-3

a,c

Rationale: WNA-DS-01070-GEN (Reference 8), S3a.

R4.2-4

a,c

	a,c
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Rationale: WNA-DS-01617-WBT-P (Reference 17), Figure 2.1-2 and R2.7-3, WNA-DS-01070-GEN (Reference 8), DB Reference Manual, 3BDS 005 665R401 (Reference 24), 00000-ICE-30156 (Reference 15), subsection 2.6.3.

R4.2-5	a,c
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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.7-3.

R4.2-6	a,c
---------------	-----

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.7-3.

R4.2-7	a,c
---------------	-----

Rationale: WNA-DS-01617-WBT-P (Reference 17), Figure 2.1-2 and R4.1-1.

R4.2-8	a,c
---------------	-----

Rationale: WNA-DS-01667-WBT-P (Reference 21), R4.2.1-5 and R4.4.1.2-7.

R4.2-9	a,c
---------------	-----

Rationale: WNA-DS-01617-WBT-P (Reference 17), Figure 2.1-2 and R4.1-1.

R4.2-10

a,c

Rationale: WNA-DS-01667-WBT-P (Reference 21), R4.4.1.2-2.

R4.2-11

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), Figure 2.1-2 and DB Reference Manual, 3BDS 005 665R401 (Reference 24).

R4.2-12

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), Figure 2.1-2, WNA-DS-01667-WBT-P (Reference 21), R4.4.1.2-4, and DB Reference Manual, 3BDS 005 665R401 (Reference 24).

R4.2-13

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), Figure 2.1-2 and R4.1-1 and DB Reference Manual, 3BDS 005 665R401 (Reference 24).

4.3 COMMUNICATION DB ELEMENT CONFIGURATION

4.3.1 DSP/DAT Configuration Requirements

DSP station numbers are manually assigned by the software designer as specified in the “DSP Station Numbers” column of Tables 2.3-1 and 2.3-2.

R4.3.1-1

[Sending DSPs shall be assigned the station numbers from the "DSP Station Numbers" column of the applicable Table 2.3-1 or 2.3-2.]

[] a,c

R4.3.1-2

[] a,c

R4.3.1-3

[DELETED]

R4.3.1-4

[] a,c

Rationale: 00000-ICE-3889 (Reference 4), subsection 3.3.2.1.

R4.3.1-5

[] a,c

Rationale: This requirement is an engineering judgment to avoid unnecessary bandwidth usage of the Advant Fieldbus 100 (AF100).

R4.3.1-6

[] a,c

Rationale: This requirement is an engineering judgment to avoid unnecessary bandwidth usage of the AF100. This requirement also satisfies coding standards from 00000-ICE-3889 (Reference 4).

R4.3.1-7

[] a,c

Rationale: This requirement is an engineering judgment to avoid automatic re-addressing of existing reference DATs when new reference DATs are added to a DSP. Defined within the DB Reference Manual, 3BDS 005 665R401 (Reference 24).

R4.3.1-8

a,c

Rationale: This requirement is an engineering judgment to minimize AF100 bandwidth.

R4.3.1-9

a,c

Rationale: This requirement is an engineering judgment to avoid unnecessary bandwidth usage of the AF100.

4.3.2 MDAT Configuration Requirements

MDATs are not utilized in the Watts Bar 2 PAMS.

Rationale: WNA-DS-01617-WBT-P (Reference 17), Figure 2.1-2.

4.3.3 High Speed Link (HSL) Configuration Requirements

HSLs are not utilized in the Watts Bar 2 PAMS.

Rationale: WNA-DS-01617-WBT-P (Reference 17), Figure 2.1-2.

(Last Page of Section 4)

SECTION 5 PROCESS CONTROL PROGRAMMING

5.1 GENERAL

R5.1-1

a,c

R5.1-2

[DELETED]

R5.1-3

a,c

Rationale: Engineering Judgment. The AC160 represents floating-point numbers in single precision (32bit) ANSI/IEEE Standard 754-1985, "IEEE Standard for Binary Floating-Point Arithmetic, ANSI/IEEE Std 754-1985" (Reference 26) format.

5.1.1 Initialization

R5.1.1-1

a,c

Rationale: All signals with an associated quality attribute will be defaulted to a known condition until the CONTRM containing the supervisory function has been executed.

R5.1.1-2

[DELETED]

R5.1.1-3

[DELETED]

R5.1.1-4

[DELETED]

R5.1.1-5

[The initialization requirements defined in 00000-ICE-30156 (Reference 15), subsection 2.5.1, shall apply.]

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.1-1 and R2.9.4-2.

R5.1.1-6

[

a,c

]

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.9.4-3.

5.2 STRUCTURE ELEMENT CONFIGURATION

This section of the document defines the requirements for the AC160 process control structure elements PCPGM, CONTRM, and FUNCNM. Execution order of PCPGM and CONTRM is dependent upon cycle time and priority parameter values.

The PCPGM or CONTRM element(s) with a shorter cycle time have priority over other PCPGM or CONTRM element(s) with a longer cycle time. Execution order of the PCPGM or CONTRM elements with the same cycle time is based on their respective second call parameter (placement in the cycle time [priority] table). The element with the higher priority (lower number) value will execute before an element of lower priority. If necessary, the PCPGM or CONTRM element(s) of higher priority will interrupt the lower priority PCPGM or CONTRM element(s). Once execution of the higher priority PCPGM or CONTRM element(s) is complete, the lower priority PCPGM or CONTRM element(s) resumes execution.

The following factors should be considered when determining a PCPGM or CONTRM cycle time parameter.

- The CONTRM cycle times must be set to a value high enough to prevent the processor load from exceeding the values specified in Requirement R5.1-1.
- For better sending or receiving DSP efficiency, the cycle times parameters for the CONTRMs that send or receive DSPs should be set equal to that of the PCPGM cycle time. This will ensure that these functions are performed synchronously.
- When the CONTRM cycle time parameter and the PCPGM cycle time parameters are equal, in order to obtain a shorter time response for sending DSPs, the PCPGM priority should be less than

that of the CONTRM. This allows the DSP values to be written to the Communication Interface (CI) immediately after generation.

- When the CONTRM cycle time parameter and the PCPGM cycle time parameters are equal, in order to obtain a shorter time response for receiving DSPs, the PCPGM priority should be greater than that of the CONTRM. This allows the DSP values to be received in the CONTRM immediately after being received from the CI.

The purpose of the FUNCM is to control the arrangement of the documented application code in the FCB. The FUNCM cannot affect execution. Typically, a software designer will enter information into the name attribute of the FUNCM which communicates the functionality of the subordinate PC elements (for example: STARTUP_AND_SUPERVISION or SL_PRESS_TRIP_BISTABLE_LOGIC). PC element names must be unique and have a maximum length of 72 characters.

[

a,c
]



Figure 5.2-1. []^{a,c}

5.2.1 General

R5.2.1-1



Rationale: 00000-ICE-3889 (Reference 4), subsection 3.3.2.2.

5.2.2 PCPGM Structure Element

R5.2.2-1



a,c

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R5.2.2-2

a,c

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R5.2.2-3

a,c

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Rationale: PC Reference Manual, 3BDS 005 666R101 (Reference 25).

R5.2.2-4

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.10-1 and R2.10.1-1.

5.2.3 CONTRM Structure Element

R5.2.3-1

a,c

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R5.2.3-2

a,c

--

R5.2.3-3

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R3.2.2-1. This system requirement reference addresses overall system response time. This CONTRM speed is selected to satisfy this overall system response time requirement.

5.2.4 FUNCM Structure Element

R5.2.4-1

[The FUNCM element shall be used liberally to assist in the identification of implemented requirements.]

Rationale: 00000-ICE-3889 (Reference 4), subsection 3.3.4. This requirement provides for orderly subdivision of the PC program into several functionally associated parts for readability and requirements traceability efficiency.

R5.2.4-2

[The FUNCM name field shall include a unique identifier where used.]

Rationale: 00000-ICE-3889 (Reference 4), subsection 3.3.4. To support readability and organization of the documented code.

R5.2.4-3

a,c

Rationale: 00000-ICE-3889 (Reference 4), subsection 3.3.4.

5.3 SUPERVISORY LOGIC

This section of the document defines the requirements for processor diagnostic monitoring and alarm generation within the application program. The CONTRM containing the Supervisory function and diagnostic monitoring will produce error status data that is ultimately sent to the OM and MTP for alarming and indication.

R5.3-1

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.9-1, and R2.9.2-5.

R5.3-2

a,c

Rationale: Engineering Judgment. To monitor the controller error conditions.

R5.3-3

a,c

Rationale: Engineering Judgment. To monitor the various error conditions.

R5.3-4

a,c

Guidance: The STATUS1 terminal should not be confused with STATUS1:ERR in Figure 5.3-1.

Rationale: Engineering Judgment. To monitor the PM646A error conditions.

R5.3-5

a,c

Guidance: See Figure 5.3-1.

R5.3-6

a,c

Rationale: Engineering Judgment. To monitor the PM646A error conditions.

R5.3-7

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.9-1 and R2.9.2-1.

R5.3-8

a,c

R5.3-9

a,c

[] a,c

R5.3-10 a,c
[]

Rationale: Provides a standardized detection method for AC160 station errors in PM health surveillance as per DB Reference Manual, 3BDS 005 665R401 (Reference 24).

5.3.1 CPU Load Error

R5.3.1-1 a,c
[]

R5.3.1-2 a,c
[]

R5.3.1-3 a,c
[]

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.9-1 and R2.9.3-1.

R5.3.1-4 a,c
[]

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.9-1 and R2.9.3-1.

5.3.2 CRC Invalid Error

R5.3.2-1

a,c

R5.3.2-2

a,c

R5.3.2-3

a,c

Rationale: 00000-ICE-3889 (Reference 4), Section 3.4.3. This will allow for the monitoring of CRC errors.

5.3.3 Application Program CRC Error

R5.3.3-1

a,c

R5.3.3-2

a,c

	a,c
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R5.3.3-3	a,c
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Rationale: 00000-ICE-3889 (Reference 4), Section 3.4.3. This will allow for the monitoring of the application CRC.

R5.3.3-4	a,c
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Rationale: Provides indication on system health displays.

5.3.4 System Software CRC Error

R5.3.4-1	a,c
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R5.3.4-2	a,c
-----------------	-----

Rationale: WNA-DS-01070-GEN (Reference 8), S17.

R5.3.4-3	a,c
-----------------	-----

☐ a,c

Rationale: 00000-ICE-3889 (Reference 4), Section 3.4.3. This will allow for the monitoring of the system CRC.

R5.3.4-4

a,c

Rationale: Provides indication on system health displays.

5.3.5 DSP Error

R5.3.5-1

a,c

R5.3.5-2

a,c

Rationale: 00000-ICE-3889 (Reference 4), subsections 3.3.3.3 and 3.4.8. This will allow for the monitoring of DSP error conditions.

5.3.6 Processor Module (PM646A) Error

R5.3.6-1

a,c

R5.3.6-2

a,c

Rationale: 00000-ICE-3889 (Reference 4), subsection 3.3.3.3. This will allow for the monitoring of processor module error conditions.

5.3.7 Communication Module (CI631) Error

R5.3.7-1

a,c

R5.3.7-2

a,c

Guidance: See Figure 5.3-1.

Rationale: 00000-ICE-3889 (Reference 4), subsection 3.3.3.3. This will allow for the monitoring of the communication module error conditions.

5.3.8 PROM Checksum Error

R5.3.8-1

a,c

R5.3.8-2

a,c

Guidance: See Figure 5.3-1.

Rationale: 00000-ICE-3889 (Reference 4), Section 3.4.3. This will allow for the monitoring of the PROM Checksum CRC.

5.3.9 PM Status1 Word Error

R5.3.9-1

a,c

	a,c
--	-----

Table 5.3-1. []^{a,c}

	a,c

R5.3.9-2 []^{a,c}

Rationale: 00000-ICE-3889 (Reference 4), subsection 3.3.3.3. This will allow for the monitoring of the processor module error conditions defined 00000-ICE-3889 (Reference 4), Appendix C.

5.3.10 CONTRM Run Error

R5.3.10-1 []^{a,c}

R5.3.10-2 []^{a,c}

Guidance: See Figure 5.3-1.

Rationale: 00000-ICE-3889 (Reference 4), subsection 3.3.3.3. This will allow for the monitoring of CPU runtime error conditions.

5.3.11 I/O Module Errors

R5.3.11-1

a,c

Rationale: Provides a standardized method of error detection within a module for PM diagnostics surveillance as defined within DB Reference Manual 3BDS 005 665R401 (Reference 24).

R5.3.11-2

a,c

Rationale: Provides a standardized method of error detection within a module for PM diagnostics surveillance as defined within DB Reference Manual 3BDS 005 665R401 (Reference 24).

R5.3.11-3

a,c

Guidance: See Figure 5.3-1.

Rationale: 00000-ICE-3889 (Reference 4), subsection 3.3.3.3. This will allow for the monitoring of module error conditions.

5.3.12 MDAT Error

MDATs are not utilized in the Watts Bar 2 PAMS. See WNA-DS-01617-WBT-P (Reference 17), Figure 2.1-2.

5.3.13 HSL Receive Channel 1 and 2 Errors

HSLs are not utilized in the Watts Bar 2 PAMS. See WNA-DS-01617-WBT-P (Reference 17), Figure 2.1-2.

5.3.14 Addressable Constants CRC Error

R5.3.14-1

a,c

Guidance: See Section 5.5.

Rationale: Provides a standardized detection method of a failed CRC when no last good value is available.

R5.3.14-2

a,c

Guidance: See Section 5.5.

Rationale: Provides a standardized detection method of a failed CRC when no last good value is available.

R5.3.14-3

a,c

Guidance: See Figure 5.3-1.

5.3.15 Addressable Constants CRC Warning

R5.3.15-1

a,c

Guidance: See Section 5.5.

Rationale: Provides a standardized detection method of a failed CRC when a last good value is available.

R5.3.15-2

a,c

Guidance: See Section 5.5.

Rationale: Provides a standardized detection method of a failed CRC when a last good value is available.

R5.3.15-3

a,c

Guidance: See Figure 5.3-1.

5.3.16 Application Trouble Error

R5.3.16-1

a,c

R5.3.16-2

a,c

[]

[]

Guidance: See Figure 5.3-1.

5.3.17 Controller Ready Error

R5.3.17-1

a,c

[]

[]

Guidance: See subsection 5.4.2 for further information.

Rationale: Provides controller ready status indicated on the PM diagnostic screens.

R5.3.17-2

a,c

[]

[]

Guidance: See Figure 5.3-1.

5.3.18 Processor In-Test Alarm

R5.3.18-1

a,c

[]

[]

R5.3.18-2

a,c

[]

[]

Guidance: Provides a standardized detection method of a "processor currently in test" in PM health surveillance.

R5.3.18-3

a,c

[]

[]

Guidance: See Figure 5.3-1.

5.3.19 Application Specific Errors

Other application-specific monitoring/alarming will be documented in the subsystem requirement section of this document and the application-specific Software Design Description.

R5.3.19-1

a,c

[

]

Guidance: See APPL_TRBL_ERR in Figure 5.3-1.

5.3.20 Cabinet Status Alarms

R5.3.20-1

a,c

[

]

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.9.2-5, R3.1.1-5 and R4.2.2-6.

R5.3.20-2

a,c

[

]

Rationale: WNA-DS-01617-WBT-P (Reference 17), R4.2.2-6.

R5.3.20-3

a,c

[

]

Rationale: WNA-DS-01617-WBT-P (Reference 17), R4.2.2-6.

R5.3.20-4

a,c

[

]

Rationale: WNA-DS-01617-WBT-P (Reference 17), R3.1.1-5.

R5.3.20-5

a,c

[

]

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.9.2-5.

R5.3.20-6

a,c

[

]

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.9.5-3.

5.3.21 I/O Channel Errors

a,c

[

]

R5.3.21-1

a,c

R5.3.21-2

a,c

Guidance: See Figure 5.3-1.

Rationale: 00000-ICE-3889 (Reference 4), subsection 3.3.3.3. This will allow for the monitoring of I/O module error conditions.

5.3.22 Heartbeat

a,c

R5.3.22-1

a,c

R5.3.22-2

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.1-2, R2.6.3.1-10, and R2.9.1-1.

R5.3.22-3

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.1-2, R2.6.3.1-10, and R2.9.1-1.

R5.3.22-4

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.1-5, R2.6.3.1-6, and R2.9.1-1.

5.3.23 Watchdog Timer Supervision

R5.3.23-1

a,c

Rationale: 00000-ICE-3238 (Reference 18), subsection 3.2.7.3.

R5.3.23-2

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R4.4.1-1.

5.3.24 Failure Notification, Indication, and Display

R5.3.24-1

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.2.1-2, R2.6.2.5-1, R2.6.3.1-1, R2.9.1-1, R2.9.2-2, R2.9.2-4, R2.9.4-1, R2.9.4-4, R2.9.5-4, R2.9.5-5, R2.9.5-6, and R4.2.2-3.

R5.3.24-2

[Detectable failures of the safety system shall be indicated as defined by 00000-ICE-3238 (Reference 18), with the exception of the HJTC inputs.]

Guidance: Detectable hardware and software failures in this PAMS implementation will be indicated using the flat panel displays (color changes, event lists, etc.) and digital annunciator outputs as defined in 00000-ICE-3238, (Reference 18).

Rationale: 00000-ICE-3238 (Reference 18), subsections 3.1.1, 3.1.1.1, 3.1.1.2, 3.2.5, 3.2.6, 3.2.6.3, and 3.2.7.3.

R5.3.24-3

[Failures of the safety system shall be displayed as required by 00000-ICE-30156 (Reference 15).]

Guidance: Detectable hardware and software failures in this PAMS implementation will be displayed using the flat panel displays (color changes, event lists, etc.) as defined in 00000-ICE-30156 (Reference 15).

Rationale: 00000-ICE-30156 (Reference 15), subsections 2.6.2.4, 2.6.3.1, and 2.6.3.2.

5.3.25 Error Recovery

R5.3.25-1

[

a,c
]

a,c



Figure 5.3-1. []^{a,c}

5.4 SIGNAL QUALITY PROCESSING

a,c

5.4.1 General

R5.4.1-1

[Watts Bar 2 PAMS software shall comply with the signal BYPASS requirements and guidelines defined in 00000-ICE-3238 (Reference 18).]

Rationale: 00000-ICE-3238 (Reference 18), subsections 2.1.2, 2.3, 3.1.1.1, 3.1.1.2, 3.2.2, 3.2.4, 3.2.6.5, and 3.2.6.5.2.

R5.4.1-2

[Watts Bar 2 PAMS software shall also comply with the signal BYPASS requirements and guidelines defined in WNA-DS-01617-WBT-P (Reference 17), subsection 2.5.2.1.2.]

Rationale: WNA-DS-01617-WBT-P (Reference 17), subsection 2.5.2.1.2 and R4.2.2-3.

R5.4.1-3

a,c

R5.4.1-4

a,c

R5.4.1-5

a,c

R5.4.1-6

a,c

[] a,c

R5.4.1-7 a,c
[]

R5.4.1-8 a,c
[]

R5.4.1-9 a,c
[]

5.4.2 Controller Ready a,c
[]

R5.4.2-1 a,c
[]

Rationale: Provides a standardized method of deriving PM health used for quality processing. In addition to specific application errors, all signal quality attributes will be dependent upon the Controller Ready signal as per DB Reference Manual 3BDS 005 665R401 (Reference 24).

Table 5.4-1. [

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^{a,c}

R5.4.2-2

^{a,c}

5.4.3 Input Signal Quality Processing

R5.4.3-1

^{a,c}

Rationale: 00000-ICE-3889 (Reference 4), subsection 3.3.3.3.

R5.4.3-2

^{a,c}

Rationale: 00000-ICE-3889 (Reference 4), subsection 3.3.3.3.

R5.4.3-3

^{a,c}

Guidance: See Figure 5.4-1.

Rationale: Provides a standardized method of deriving DI Input health used for quality processing.

R5.4.3-4

a,c

Guidance: See Figure 5.4-1.

Rationale: Provides a standardized method of deriving AI Input health used for quality processing.

R5.4.3-5

[DELETED]

R5.4.3-6

a,c

R5.4.3-7

a,c

R5.4.3-8

a,c

5.4.4 HSL Receive Error Processing

HSLs are not utilized in Watts Bar 2 PAMS.

Rationale: WNA-DS-01617-WBT-P (Reference 17), Figure 2.1-2.

5.4.5 MDAT Receive Error Processing

MDATs are not utilized in Watts Bar 2 PAMS.

Rationale: WNA-DS-01617-WBT-P (Reference 17), Figure 2.1-2.

5.4.6 DAT (AF100) Receive Error Processing

R5.4.6-1

☐

a,c

☐

Rationale: 00000-ICE-3889 (Reference 4), subsection 3.3.3.3.

R5.4.6-2

☐

a,c

☐

Guidance: See Figure 5.4-1.

Rationale: 00000-ICE-3889 (Reference 4), subsection 3.3.3.3. This provides a standardized method of deriving DAT input health used for quality processing.

R5.4.6-3

☐

a,c

☐

Guidance: See Figure 5.4-1.

Rationale: 00000-ICE-3889 (Reference 4), subsection 3.3.3.3. This provides a standardized method of deriving DAT input health used for quality processing.

5.4.7 Plant Computer Datalink

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R5.4.7-1

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a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R4.3.3-3.

a,c



Figure 5.4-1. [

] ^{a,c}

5.5 ADDRESSABLE CONSTANTS DATA PROCESSING

a,c

R5.5-1

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.2.1-1, R2.6.2.5-1, R2.6.3.1-1, R2.6.3.2-1, R3.1.6-1, and R4.2.2-3.

R5.5-2

a,c

R5.5-3

a,c

Rationale: WNA-DS-00315-GEN (Reference 12).

R5.5-4

a,c

Rationale: WNA-DS-00315-GEN (Reference 12).

R5.5-5

a,c

Rationale: WNA-DS-00315-GEN (Reference 12).

R5.5-6

a,c

R5.5-7

a,c

R5.5-8

a,c

Guidance: See Figure 5.5-1.

R5.5-9

a,c

R5.5-10

a,c

R5.5-11

a,c

Guidance: See Figure 5.5-1.

Rationale: Supports the Addressable Constants data verification process.

R5,5-12

a,c

Rationale: Supports the Addressable Constants data verification process.

a,c



Figure 5.5-1. []^{a,c}
(Last Page of Section 5)

SECTION 6 SURVEILLANCE TESTING FEATURES

This section of the document defines the general surveillance testing requirements in accordance with 00000-ICE-3238, "Software Requirements Specification for the Common Q Post Accident Monitoring System" (Reference 18). The Watts Bar 2 PAMS software design includes a combination of continuous diagnostic features, continuous self-checking features, and manual initiated testing features. Successful testing consists of verifying that the capability of the system to perform the safety function has not failed or degraded.

Application-specific testing features will be documented in the subsystem requirement section of this document and the application-specific Software Design Description.

6.1 CONTINUOUS ONLINE DIAGNOSTICS

6.1.1 AC160 Online Diagnostics



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No AC160 continuous online diagnostics will adversely affect any PAMS' safety function.

6.1.2 Flat Panel Display Online Diagnostics

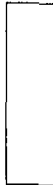


a,c



No OM or MTP continuous online diagnostics will adversely affect any PAMS' safety function.

R6.1.2-1



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Rationale: 00000-ICE-3239 (Reference 9), subsection 3.2.11.

R6.1.2-2

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.9-1 and 00000-ICE-3239 (Reference 9), subsection 3.2.13.

R6.1.2-3

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.9-1 and 00000-ICE-30155, "System Requirements Specification for the Common Q Generic Flat Panel Display" (Reference 7), R2.5.1-6.

R6.1.2-4

a,c

Rationale: This supports the storage of addressable constants (setpoints) in flash in fulfillment of WNA-DS-01617-WBT-P (Reference 17), R2.5.2.1.2-4.

R6.1.2-5

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.1-1 and 00000-ICE-3239 (Reference 9), subsection 3.2.7.

R6.1.2-6

a,c

a,c

Rationale: To support event list and event log requirements in WNA-DS-01617-WBT-P (Reference 17), R2.6.2.1-1, R2.6.2.2.11-1, and R2.6.3.1-1 (guidance - to justify sameness between the OM and the MTP) and 00000-ICE-3239 (Reference 9), subsections 3.2.2, 3.2.2.4, 3.2.2.5, and 3.2.16.

R6.1.2-7

a,c

Rationale: To support the FPD status list requirements in WNA-DS-01617-WBT-P (Reference 17), R2.6.2.1-1, R2.6.2.2.13-1, and R2.6.3.1-1 (guidance - to justify sameness between the OM and the MTP) and 00000-ICE-3239 (Reference 9), subsections 3.2.2.2, and 3.2.6.

6.2 MANUALLY INITIATED TESTING

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R6.2-1

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.3.3-1.

R6.2-2

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.3.2-1.

R6.2-3

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.3.3-1.

R6.2-4

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[] a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.19-3.

R6.2-5 [] a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.19-4.

R6.2-6 [] a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.19-11 and R2.6.3.3-7.

R6.2-7 [] a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.19-11.

R6.2-8 [] a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.19-11.

SECTION 7
WATTS BAR 2 PAMS DESCRIPTIONS/REQUIREMENTS

7.1 WATTS BAR 2 PAMS AC160 SOFTWARE

7.1.1 General

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7.1.2 Type Circuits and Custom PC Elements

R7.1.2-1

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Table 7.1-1. [

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Table 7.1-1. [

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7.1.3 Inputs

7.1.3.1 Analog/Digital Inputs



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R7.1.3.1-1

[The analog inputs to the Watts Bar 2 PAMS AC160 system shall be configured as defined in WNA-DS-01667-WBT-P (Reference 21), Table 4.4-2, Table 4.4-3, Table 4.4-7A, Table 4.4-7B, Table 4.4-8A, Table 4.4-8B, Table 4.4-9A, Table 4.4-9B, Table 4.4-10A, and Table 4.4-10B.]

Guidance: The configuration of the AI687 and AI688 modules are defined in Section 4.2. Additionally, WNA-DS-01667-WBT-P (Reference 21) specifies the analog card type, position in the chassis, and channel assignment for each of the analog inputs.

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.5-2, R2.5.3.5-3, R3.2.1-1, R3.2.1-2, R4.2-1, and R4.2.1-5, and WNA-DS-01667-WBT-P (Reference 21), R4.4.1.2-2, R4.4.1.2-3, R4.4.1.2-7, R4.4.1.2-8, R4.4.1.2-9, and R4.4.1.2-10.

R7.1.3.1-2

[The digital inputs to the Watts Bar 2 PAMS AC160 system shall be configured as defined in WNA-DS-01667-WBT-P (Reference 21), Table 4.4-1.]

Guidance: The configuration of the DI620 module is defined in Section 4.2. Additionally, WNA-DS-01667-WBT-P (Reference 21) specifies the digital card type, position in the chassis, and channel assignment for each of the digital inputs.

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4.9-4, R3.2.1-1, R4.2-1, and R4.2.2-1, and WNA-DS-01667-WBT-P (Reference 21), R4.4.1.2-1.

7.1.3.2 HSL Inputs

HSLs are not utilized in Watts Bar 2 PAMS.

7.1.3.3 AF100 Inputs

A description of the AF100 interface between the Watts Bar 2 PAMS AC160 system and the FPDS can be found in 00000-ICE-3238 (Reference 18).

R7.1.3.3-1



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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.3.3-1 and 00000-ICE-30156 (Reference 15), subsection 2.3.3.

R7.1.3.3-2

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Rationale: 00000-ICE-3238 (Reference 18), subsection 2.1.2.

R7.1.3.3-3

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.1-2, R2.6.3.1-10, and R2.9.1-1, and 00000-ICE-3238 (Reference 18), subsection 3.2.7.2.

7.1.3.4 MDAT Inputs

MDATs are not utilized in Watts Bar 2 PAMS.

7.1.4 Processing

This section defines the software requirements for the functional algorithms to be used for Watts Bar PAMS. These requirements are based on those defined for a Common Q PAMS system in 00000-ICE-3238 (Reference 18). The subsections in this document, with the exception of the RVLIS, correspond to the Functional Requirements sections in 00000-ICE-3238 (Reference 18). The Functional requirements for the RVLIS can be found in WNA-DS-01617-WBT-P (Reference 17).

7.1.4.1 Input Processing

R7.1.4.1-1

[The requirements of 00000-ICE-3238 (Reference 18), subsection 3.2.1, "Input Processing," shall apply for the inputs of the Watts Bar 2 PAMS, with the exception of the HJTC inputs.]

Guidance: HJTC inputs do not apply to Watts Bar 2 PAMS per WNA-DS-01617-WBT-P (Reference 17), R2.3.1-1.

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.3.1-1 and R2.5.3.1-1.

R7.1.4.1-2

a,c

Rationale: 00000-ICE-30152, "Software Design Description for the Common Q Phase 3 Post Accident Monitoring System AC160 Station" (Reference 22), Section 6.3.

R7.1.4.1-3

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.5-4.

R7.1.4.1-4

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.5-5.

R7.1.4.1-5

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.5-6.

R7.1.4.1-6

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.5-7.

R7.1.4.1-7

[The analog input processing requirements defined in 00000-ICE-30156 (Reference 15), subsection 2.5.3.1, shall apply.]

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.1-1.

R7.1.4.1-8

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.1-2.

R7.1.4.1-9

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.1-3.

R7.1.4.1-10

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.1-4.

R7.1.4.1-11

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.5-8.

R7.1.4.1-12

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.5-9.

R7.1.4.1-13

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.5-10.

R7.1.4.1-14

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.5-11.

7.1.4.2 CET Monitoring

The Core Exit Thermocouple Monitoring System (CETMS) monitors CET temperatures to detect and alarm inadequate core cooling conditions.

R7.1.4.2-1

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.5-1.

R7.1.4.2-2

[The requirements for CET monitoring defined in subsection 3.2.2 of 00000-ICE-3238 (Reference 18) shall apply.]

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.5-1 and 00000-ICE-30156 (Reference 15), subsection 2.5.3.4.

R7.1.4.2-3

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.5-1 and R2.6.2.2.5-5 and 00000-ICE-3238 (Reference 18), subsection 2.5.1.

R7.1.4.2-4

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.2.1.1-1 and R4.2.2-3.

R7.1.4.2-5

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.2.1.1-2 and R4.2.2-3.

R7.1.4.2-6

a,c

Rationale: 00000-ICE-3238 (Reference 18), subsection 3.2.2.

7.1.4.3 RVLIS Monitoring

The RVLIS monitors the collapsed liquid level above the fuel alignment plate to indicate the approach of an inadequate core cooling situation.

R7.1.4.3-1

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), subsections 2.5.3.3, 2.5.3.4, 2.5.3.4.1, 2.5.3.4.2, 2.5.3.4.3, 2.5.3.4.4, 2.5.3.4.5, 2.5.3.4.6, 2.5.3.4.7, 2.5.3.4.8, 2.5.3.4.9, 2.5.3.4.10, 2.5.3.4.11, 2.5.3.4.12, 2.5.3.4.13, 2.5.3.4.14, 2.5.3.4.15, 2.5.3.4.16, 2.5.3.4.17, 2.5.3.4.18, 2.5.3.4.19, and 2.5.3.4.20.

R7.1.4.3-2

[The RVLIS inputs defined in Table 2.5-4 of WNA-DS-01617-WBT-P (Reference 17) shall apply.]

Rationale: WNA-DS-01617-WBT-P (Reference 17), subsection 2.5.3.3.

R7.1.4.3-3

[The RVLIS monitoring input processing requirements defined in subsection 2.5.3.3 of WNA-DS-01617-WBT-P (Reference 17) shall apply.]

Rationale: WNA-DS-01617-WBT-P (Reference 17), subsection 2.5.3.3.

R7.1.4.3-4

[The RVLIS monitoring requirements defined in subsections 2.5.3.4 through 2.5.3.4.20 of WNA-DS-01617-WBT-P (Reference 17) shall apply.]

Rationale: WNA-DS-01617-WBT-P (Reference 17), subsections 2.5.3.4, 2.5.3.4.1, 2.5.3.4.2, 2.5.3.4.3, 2.5.3.4.4, 2.5.3.4.5, 2.5.3.4.6, 2.5.3.4.7, 2.5.3.4.8, 2.5.3.4.9, 2.5.3.4.10, 2.5.3.4.11, 2.5.3.4.12, 2.5.3.4.13, 2.5.3.4.14, 2.5.3.4.15, 2.5.3.4.16, 2.5.3.4.17, 2.5.3.4.18, 2.5.3.4.19, and 2.5.3.4.20.

R7.1.4.3-5

[The Reactor Vessel Level shall be calculated using different algorithms based on whether the plant is in Static or Dynamic conditions.]

Guidance: See Figures 7.1-1 and 7.1-2.

Rationale: WNA-DS-01617-WBT-P, subsections 2.5.3.4.6, 2.5.3.4.7, 2.5.3.4.9, 2.5.3.4.10, 2.5.3.4.11, 2.5.3.4.12, 2.5.3.4.13, 2.5.3.4.14, 2.5.3.4.15, 2.5.3.4.16, 2.5.3.4.17, 2.5.3.4.18, and 2.5.3.4.19.



Figure 7.1-1. [

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a,c

Figure 7.1-2. []^{a,c}

R7.1.4.3-6

a,c



Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4.18-1.

R7.1.4.3-7

a,c



Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4.18-2.

R7.1.4.3-8

a,c



Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.3-14 and R2.5.3.3-16.

R7.1.4.3-9

a,c



Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4.1-1, R2.5.3.4.1-2, R2.5.3.4.1-3, R2.5.3.4.1-4, R2.5.3.4.1-5, and R2.5.3.4.1-6.

R7.1.4.3-10

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4.1-1.

R7.1.4.3-11

[The three corrected differential pressures used in the RVLIS monitoring calculation shall be determined as described in subsection 2.5.3.4.2 of WNA-DS-01617-WBT-P (Reference 17).]

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4.2-1, R2.5.3.4.2-2, R2.5.3.4.2-3, R2.5.3.4.2-4, and R2.5.3.4.2-5.

R7.1.4.3-12

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4.2-2.

R7.1.4.3-13

[The reactor vessel density calculation for liquid conditions defined in subsection 2.5.3.4.3 of WNA-DS-01617-WBT-P (Reference 17) shall apply.]

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4.3-1, R2.5.3.4.3-2, R2.5.3.4.3-3, R2.5.3.4.3-4, R2.5.3.4.3-5, R2.5.3.4.3-6, and R2.5.3.4.3-7.

R7.1.4.3-14

[The reactor vessel density calculation for gaseous conditions defined in subsection 2.5.3.4.4 of WNA-DS-01617-WBT-P (Reference 17) shall apply.]

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4.4-1, R2.5.3.4.4-2, R2.5.3.4.4-3, R2.5.3.4.4-4, R2.5.3.4.4-5, R2.5.3.4.4-6, and R2.5.3.4.4-7.

R7.1.4.3-15

[The auctioneered high RCS hot leg temperature (T_{RCS}) calculation used in the RVLIS calculation shall be determined as defined in subsection 2.5.3.4.5 of WNA-DS-01617-WBT-P (Reference 17).]

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4.5-1, R2.5.3.4.5-2, R2.5.3.4.5-3, R2.5.3.4.5-4, R2.5.3.4.5-5, and R2.5.3.4.5-6.

R7.1.4.3-16

[The algorithm to determine the static conditions upper range reactor vessel level (h_1) and lower range reactor vessel level (h_2) described in subsection 2.5.3.4.6 of WNA-DS-01617-WBT-P (Reference 17) shall apply.]

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4.6-1, R2.5.3.4.6-2, R2.5.3.4.6-3, R2.5.3.4.6-4, and R2.5.3.4.6-5.

R7.1.4.3-17

[

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4.19-2.

R7.1.4.3-18

[The algorithm that determines the cross-over point between the static conditions upper range reactor vessel level (h_1) and lower range reactor vessel level (h_2) defined in subsection 2.5.3.4.7 of WNA-DS-01617-WBT-P (Reference 17) shall apply.]

Rationale: WNA-DS-01617-WBT-P (Reference 17), subsection 2.5.3.4.7.

R7.1.4.3-19

[

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4.7-4.

R7.1.4.3-20

[When a hydraulic isolator status is “off scale,” any vessel level associated with that hydraulic isolator shall be assigned a status of “Failed.”]

Rationale: WNA-DS-01617-WBT-P (Reference 17), subsection 2.5.3.4.8-1.

R7.1.4.3-21

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4.9-2.

R7.1.4.3-22

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4.9-3.

R7.1.4.3-23

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4.14-1 and R2.5.3.4.14-2.

R7.1.4.3-24

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4.14-3.

R7.1.4.3-25

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4.14-3.

R7.1.4.3-26

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4.14-3.

R7.1.4.3-27

[] a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4.14-4.

R7.1.4.3-28

[The algorithm for the expected uncompensated dynamic head (EUDH) calculation defined in subsection 2.5.3.4.10 of WNA-DS-01617-WBT-P (Reference 17) shall apply.]

[] a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4.10-1, R2.5.3.4.10-2, R2.5.3.4.10-3, R2.5.3.4.10-4, R2.5.3.4.10-5, and R2.5.3.4.10-6.

R7.1.4.3-29

[] a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4.10-1.

R7.1.4.3-30

[The algorithm for the uncompensated dynamic head (UDH) calculation defined in subsection 2.5.3.4.11 of WNA-DS-01617-WBT-P (Reference 17) shall apply.]

[] a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4.11-1, R2.5.3.4.11-2, R2.5.3.4.11-3, R2.5.3.4.11-4, and R2.5.3.4.11-5.

R7.1.4.3-31

[The algorithm for the power compensated head (PDH) calculation defined in subsection 2.5.3.4.12 of WNA-DS-01617-WBT-P (Reference 17) shall apply.]

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4.12-1, R2.5.3.4.12-2, R2.5.3.4.12-3, R2.5.3.4.12-4, R2.5.3.4.12-5, and R2.5.3.4.12-6.

R7.1.4.3-32

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4.12-2.

R7.1.4.3-33

[The algorithm for the normalized dynamic head (NDH) calculation defined in subsection 2.5.3.4.13 of WNA-DS-01617-WBT-P (Reference 17) shall be applied when some but not all reactor coolant pumps are operational.]

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4.13-1, R2.5.3.4.13-2, R2.5.3.4.13-3, R2.5.3.4.13-4, R2.5.3.4.13-5, R2.5.3.4.13-6, R2.5.3.4.13-7, R2.5.3.4.13-8 and R2.5.3.4.13-9.

R7.1.4.3-34

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4.13-1, R2.5.3.4.13-2, R2.5.3.4.13-3, R2.5.3.4.13-4, R2.5.3.4.13-5, R2.5.3.4.13-6, R2.5.3.4.13-7, R2.5.3.4.13-8 and R2.5.3.4.13-9.

R7.1.4.3-35

[The reactor vessel level shall be scaled as specified in subsection 2.5.3.4.15 of WNA-DS-01617-WBT-P (Reference 17).]

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4.15-1, R2.5.3.4.15-2, R2.5.3.4.15-3, R2.5.3.4.15-4, and R2.5.3.4.15-5.

R7.1.4.3-36

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4.15-1, R2.5.3.4.15-2, R2.5.3.4.15-3, R2.5.3.4.15-4, and R2.5.3.4.15-5.

R7.1.4.3-37

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4.15-1, R2.5.3.4.15-2, R2.5.3.4.15-3, R2.5.3.4.15-4, and R2.5.3.4.15-5.

R7.1.4.3-38

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4.15-1, R2.5.3.4.15-2, R2.5.3.4.15-3, R2.5.3.4.15-4, and R2.5.3.4.15-5.

R7.1.4.3-39

[The reactor vessel level algorithm shall support the off-scale requirements specified in subsection 2.5.3.4.16 of WNA-DS-01617-WBT-P (Reference 17).]

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4.16-1 and R2.5.3.4.16-2.

R7.1.4.3-40

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4.16-1 and R2.5.3.4.16-2.

R7.1.4.3-41

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4.16-1 and R2.5.3.4.16-2.

R7.1.4.3-42

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4.16-1 and R2.5.3.4.16-2.

R7.1.4.3-43

[The RVLIS level alarms and setpoint requirements specified in subsection 2.5.3.4.17 of WNA-DS-01617-WBT-P (Reference 17) shall apply.]



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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4.17-1, R2.5.3.4.17-2, R2.5.3.4.17-3, R2.5.3.4.17-4, R2.5.3.4.17-5, R2.5.3.4.17-6, R2.5.3.4.17-7, and R2.5.3.4.17-8.

R7.1.4.3-44



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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4.17-1, R2.5.3.4.17-2, and R2.5.3.4.17-4.

R7.1.4.3-45



a,c



Rationale: WNA-DS-01617-WBT-P (Reference 17), subsection 2.5.3.4.20-1.

R7.1.4.3-46



a,c



Rationale: WNA-DS-01617-WBT-P (Reference 17), subsection 2.5.3.4.20-2.

R7.1.4.3-47



a,c



Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.3-17.

R7.1.4.3-48



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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4-1.

R7.1.4.3-49



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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4-2.

R7.1.4.3-50

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.3-13.

R7.1.4.3-51

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4.8-3 and R2.6.2.2.8-1.

R7.1.4.3-52

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4.20-3.

R7.1.4.3-53

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.3-15.

7.1.4.4 Saturation Margin Monitoring

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R7.1.4.4-1

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Rationale: WNA-DS-01617-WBT-P (Reference 17), subsection 2.5.3.2.

R7.1.4.4-2

[The requirements for the Saturation Margin Monitoring algorithm defined in subsection 2.5.3.2 of WNA-DS-01617-WBT-P (Reference 17) shall apply.]

Rationale: WNA-DS-01617-WBT-P (Reference 17), subsection 2.5.3.2.

R7.1.4.4-3

[The inputs to the Saturation Margin Monitoring algorithm shall be as defined in Table 2.5-1 of WNA-DS-01617-WBT-P (Reference 17).]

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.2-3.

R7.1.4.4-4

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.2-3.

R7.1.4.4-5

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.2-3.

R7.1.4.4-6

	a,c
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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.2-3.

R7.1.4.4-7

	a,c
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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.2-15.

R7.1.4.4-8

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.2-15.

R7.1.4.4-9

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.2-16.

R7.1.4.4-10

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.2-11.

R7.1.4.4-11

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.3.1-1.

R7.1.4.4-12

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.2-3.

7.1.4.5 Timestamp Processing

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R7.1.4.5-1

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Rationale: 00000-ICE-3238 (Reference 18), subsection 3.2.5.

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R7.1.4.6-2

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R4.3.2-6.

Table 7.1-3. []^{a,c}

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R7.1.4.6-3

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Rationale: WNA-DS-01617-WBT-P, R4.3.2-4, R4.3.2-5, R4.3.2-6, and R4.3.2-7.

R7.1.4.6-4

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R4.3.2-8.

R7.1.4.6-5

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R4.3.2-8.

R7.1.4.6-6

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R4.3.2-8.

Table 7.1-4. [

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R7.1.4.6-7

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R4.4.1-1.

R7.1.4.6-8

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[illegible]

7.1.4.7 Analog Output Testing

R7.1.4.7-1

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.19-11.

R7.1.4.7-2

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.19-11.

7.1.5 Outputs

7.1.5.1 Analog Outputs

The analog outputs defined in WNA-DS-01667-WBT-P (Reference 21) will be determined and processed by the Watts Bar 2 PAMS software and sent to the appropriate analog output module and channels.

R7.1.5.1-1

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R3.2.1-1, R4.2-1, R3.2.1-3, R4.3.1-1, R4.3.1-3, and R4.3.1-4 and WNA-DS-01667-WBT-P (Reference 21), R4.4.1.2-4 and R4.4.2.1-5.

R7.1.5.1-2

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R4.3.1-1.

R7.1.5.1-3

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R4.3.1-3.

R7.1.5.1-4

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.1-2, R4.3.1-3, and R4.3.1-4.

R7.1.5.1-5

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.1-2, R4.3.1-3, and R4.3.1-4.

R7.1.5.1-6

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R4.3.1-5.

7.1.5.2 Digital Outputs

The digital outputs defined in WNA-DS-01667-WBT-P (Reference 21) will be determined and processed by the Watts Bar 2 PAMS software and written to the appropriate module and channels.

R7.1.5.2-1

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R3.2.1-1, R4.3.2-1, R4.3.2-2, R4.3.2-3, R4.3.2-4, R4.3.2-5, R4.3.2-6, and R4.3.2-7, and WNA-DS-01667-WBT-P (Reference 21), R4.4.1.2-6.

R7.1.5.2-2

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R4.3.2-3.

R7.1.5.2-3

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R4.3.2-4.

R7.1.5.2-4

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R4.3.2-5.

R7.1.5.2-5

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R4.3.2-6.

R7.1.5.2-6

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R4.3.2-7.

7.1.5.3 HSL Outputs

HSLs are not utilized in the Watts Bar 2 PAMS.

Rationale: WNA-DS-01617-WBT-P (Reference 17), Figure 2.1-2.

7.1.5.4 AF100 Outputs

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R7.1.5.4-1

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2-4, R2.6.2.2-5, and R2.6.2.2-6.

R7.1.5.4-2

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R4.3.3-2.

R7.1.5.4-3

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.16-1, R2.9-1, R2.9.1-1, R2.9.2-5, and 00000-ICE-30156 (Reference 15), subsection 2.6.2.2.17.

R7.1.5.4-4

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.1-3, R2.9-1, and R2.9.1-1.

R7.1.5.4-5

a,c

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Rationale: WCAP-16097-P-A (Reference 6), Section 6.2.2.3.2.2, CAPS Issue 08-044-W006.

R7.1.5.4-6

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Rationale: WCAP-16097-P-A (Reference 6), Section 6.2.2.3.2.2, CAPS Issue 08-044-W006.

R7.1.5.4-7

[The Watts Bar 2 PAMS AC160 shall transmit all the analog and digital inputs as they are received from the I/O module prior to any signal processing by the PAMS application to the OM and MTP.]

Guidance: This data must be transmitted to the OM and MTP from the AC160 so that it may be displayed.

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.20-3.

R7.1.5.4-8

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.7-2 and R2.9.3-1.

R7.1.5.4-9

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.16-3.

R7.1.5.4-10

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4.18-4.

R7.1.5.4-11

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4.18-5.

R7.1.5.4-12

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4.18-3.

R7.1.5.4-13

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.7-1.

7.1.5.5 MDAT Outputs

MDATs are not utilized in the Watts Bar 2 PAMS.

7.1.6 Timing

General timing requirements and guidelines for the Watts Bar 2 PAMS are given in Sections 4 and 5 of this document.

R7.1.6-1

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R3.2.2-1, R3.2.2-2, and 00000-ICE-3238 (Reference 18), Section 3.3.

Table 7.1-6. []^{a,c}

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R7.1.6-2

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R3.2.2-1 and 00000-ICE-3238 (Reference 18), Section 3.3.

R7.1.6-3

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R3.2.2-1 and 00000-ICE-3238 (Reference 18), Section 3.3.

7.1.7 Response to Abnormal Conditions

See supervisory and quality processing functions described in Sections 5.3 and 5.4, respectively, for standard responses to detected hardware and software failures.

7.1.8 Application-Specific Errors

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R7.1.8-1

a,c

Rationale: 00000-ICE-3238 (Reference 18), subsection 3.2.2.

R7.1.8-2

a,c

Rationale: 00000-ICE-3238 (Reference 18), subsection 3.2.4.

7.1.9 Error Recovery

General error and "BAD" quality recovery requirements for the Watts Bar 2 PAMS are given in Sections 5.3 and 5.4 of this document.

7.1.10 Initialization

General initialization requirements for the Watts Bar 2 PAMS are given in Section 5.1 of this document.

R7.1.10-1

a,c

R7.1.10-2

a,c

7.1.11 Communication DB Element Models

R7.1.11-1

a,c

Rationale: Engineering Judgment.

7.1.12 Naming Conventions

R7.1.12-1

a,c

Rationale: 00000-ICE-3889 (Reference 4).

7.1.13 AC160 Constraints

R7.1.13-1

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.4-1 and 00000-ICE-3238 (Reference 18), Section 2.4.

7.1.14 AC160 Performance

R7.1.14-1

[The AC160 software performance requirements specified in Section 3.3 of 00000-ICE-3238, "Software Requirements Specification for the Common Q Post Accident Monitoring System" (Reference 18) shall apply.]

Rationale: 00000-ICE-3238 (Reference 18), Section 3.3.

7.1.15 AC160 Reliability

R7.1.15-1

[To ensure high software quality, the Watts Bar 2 PAMS AC160 software shall be developed following the 00000-ICE-3889, "Coding Standards and Guidelines for Common Q Systems" (Reference 4).]

Rationale: 00000-ICE-3889 (Reference 4).

7.1.16 AC160 Maintainability

R7.1.16-1

[The Watts Bar 2 PAMS AC160 software shall meet the maintainability requirements specified in subsection 3.6.4 of 00000-ICE-3238, "Software Requirements Specification for the Common Q Post Accident Monitoring System" (Reference 18).]

Rationale: 00000-ICE-3238 (Reference 18), subsection 3.6.4.

7.1.17 AC160 Portability

R7.1.17-1

[The Watts Bar 2 PAMS AC160 software shall meet the portability requirements specified in subsection 3.6.5 of 00000-ICE-3238, "Software Requirements Specification for the Common Q Post Accident Monitoring System" (Reference 18).]

Rationale: 00000-ICE-3238 (Reference 18), subsection 3.6.5.

7.1.18 AC160 Memory Constraints

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7.1.19 AC160 Operations

The Watts Bar 2 PAMS AC160 normal and special operations are all initiated through the FPDS user interfaces as defined in subsection 7.2.51.

7.1.20 AC160 Site Adaptation Requirements

This AC160 software is designed or selected specifically for the Watts Bar Unit 2 site and therefore there are no site-specific adaptations requirements.

7.1.21 AC160 User Characteristics

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No AC160 software maintenance should be performed without first reading and understanding this document in its entirety.

7.1.22 AC160 Assumptions and Dependencies

Refer to the Open Items list at the start of this document for any assumptions and dependencies applicable to these AC160 software requirements.

7.1.23 AC160 Apportioning of Requirements

All of the AC160 requirements listed in this document are applicable to the design of the AC160 and none of these requirements may be altered, omitted, or delayed.

7.1.24 AC160 Availability

R7.1.24-1

[The availability requirements defined in WNA-DS-01617-WBT-P (Reference 17), R3.3.3-1 and 00000-ICE-30156 (Reference 15), subsection 3.3.3 shall apply.]

Rationale: WNA-DS-01617-WBT-P (Reference 17), R3.3.3-1 and 00000-ICE-30156 (Reference 15), subsection 3.3.3.

7.2 WATTS BAR 2 PAMS FPDS SOFTWARE

7.2.1 General

The human-machine interface (HMI) for the Watts Bar 2 PAMS is provided by the FPDS software located in the OM and MTP. Both the OM and MTP will provide pre-formatted displays of PAMS' dynamic information. The OM and MTP will provide the real-time display processing of the:

- CET monitoring
- Reactor vessel level monitoring
- Subcooled margin monitoring

Specific details of information displayed by the Watts Bar 2 PAMS FPDS are defined in WNA-DS-01617-WBT-P, "Watts Bar 2 NSSS Completion Program I&C Projects Post Accident Monitoring System – System Requirements Specification" (Reference 17). 00000-ICE-30156, "System Requirements Specification for the Common Q Post Accident Monitoring System" (Reference 15) defines the system requirements for the generic Common Q PAMS. 00000-ICE-30155, "System Requirements Specification for the Generic Flat Panel Display" (Reference 7) and 00000-ICE-3239, "Software Requirements Specification for the Common Q Generic Flat-Panel Display Software" (Reference 9) provide the functional and software requirements for the generic FPD, respectively.

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7.2.2 Display Pages

R7.2.2-1

[The Display Pages that shall be implemented for the Watts Bar 2 PAMS are defined in Section 2.6 of WNA-DS-01617-WBT-P, "Watts Bar 2 NSSS Completion Program I&C Projects Post Accident Monitoring System – System Requirements Specification" (Reference 17).]

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2-1, Table 2.6-1, R2.6.1-3, and R2.6.3.2-1.

The following requirements are applicable to all OM and MTP display pages.

R7.2.2-2

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.1-9 and engineering judgment with regard to placement.

R7.2.2-3

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.1-10 and R2.6.3.1-1 (guidance), and engineering judgment with regard to placement.

R7.2.2-4

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Rationale: Engineering judgment and to provide consistency with other Common Q systems.

R7.2.2-5

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Rationale: Engineering judgment and to provide consistency with other Common Q systems.

R7.2.2-6

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), Table 2.6.1, R2.6.3.2-1, and engineering judgment with regard to placement.

R7.2.2-7

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.1-1, R2.6.2.2-7, and R2.6.3.1-12.

R7.2.2-8

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.1-1, R2.6.2.2-7, and R2.6.3.1-12.

R7.2.2-9

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2-8, R2.6.3.1-13, and R2.6.3.2-1.

R7.2.2-10

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2-9, R2.6.3.1-14, and R2.6.3.2-1.

R7.2.2-11

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2-10, R2.6.3.1-15, and R2.6.3.2-1.

R7.2.2-12

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2-11, R2.6.3.1-16, and R2.6.3.2-1.

R7.2.2-13

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.3.2-1 (regarding navigation) and engineering judgment to provide consistency with other Common Q systems.

R7.2.2-14

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.9.4-5, R2.9.4-6, and R2.6.2.2-2.

R7.2.2-15

a,c

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a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.1-3, R2.6.3.1-5, R2.9.5-4, R2.9.5-5, R2.9.5-6, and R4.2.2-6.

R7.2.2-16

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.4-1, Table 2.6-5, R2.9.5-4, R2.9.5-5, and R2.9.5-6.

7.2.3 Directory

R7.2.3-1

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), Table 2.6-1, R2.6.2.1-1, and R2.6.3.2-1.

R7.2.3-2

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), Table 2.6-1 and R2.6.2.1-1.

7.2.4 ICC Summary

R7.2.4-1

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), Table 2.6-1 and R2.6.3.1-1 (guidance).

R7.2.4-2

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2-1.

R7.2.4-3

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.2-1.

R7.2.4-4

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.2-1.

R7.2.4-5

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.2-1.

R7.2.4-6

a,c

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Rationale: Engineering judgment to provide information available on Watts Bar Unit 1 PAMS.

R7.2.4-7

a,c

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Rationale: Engineering judgment to provide information available on Watts Bar Unit 1 PAMS.

R7.2.4-8

a,c

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Rationale: Engineering judgment to provide information available on Watts Bar Unit 1 PAMS.

R7.2.4-9

a,c

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Rationale: Engineering judgment to be consistent with other displays in this system.

R7.2.4-10

a,c

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Rationale: Engineering judgment to provide information available on Watts Bar Unit 1 PAMS.

7.2.5 Core Summary Display

R7.2.5-1

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), Table 2.6-1 and R2.6.3.1-1 (guidance).

R7.2.5-2

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.1-1.

7.2.6 Saturation Margin Display

R7.2.6-1

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), Table 2.6-1 and R2.6.3.1-1 (guidance).

R7.2.6-2

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.3-1.

7.2.7 Reactor Vessel Level Display

The Reactor Vessel Level Display page provides the operator with a graphical depiction of the reactor vessel level and will display other RVLIS parameters.

R7.2.7-1

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), Table 2.6-1 and R2.6.3.1-1 (guidance).

R7.2.7-2

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.6-1.

R7.2.7-3

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.6-2.

R7.2.7-4

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4.18-4 and R2.6.2.2.6-3.

R7.2.7-5

a,c

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Rationale: Engineering Judgment

R7.2.7-6

a,c

☐☐

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4.18-3.

R7.2.7-7

a,c

☐☐

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4.18-5.

R7.2.7-8

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.6-4.

7.2.8 Level Bar Graphs Display

R7.2.8-1

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), Table 2.6-1 and R2.6.3.1-1 (guidance).

R7.2.8-2

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.7-1.

R7.2.8-3

a,c

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Rationale: Engineering judgment to match the Reactor Vessel Level Display page requirement, WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4.18-3.

R7.2.8-4

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.7-3.

R7.2.8-5

a,c

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Rationale: Engineering judgment to match the Reactor Vessel Level Display page requirement, WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4.18-5.

R7.2.8-6

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.7-2.

7.2.9 Reactor Vessel Level Sensors Display

R7.2.9-1

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), Table 2.6-1 and R2.6.3.1-1 (guidance).

R7.2.9-2

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.8-1 and R2.6.3.1-9.

R7.2.9-3

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R3.2.3-2.

7.2.10 Core Exit Thermocouples Display

a,c

R7.2.10-1

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), Table 2.6-1 and R2.6.3.1-1 (guidance).

R7.2.10-2

a,c

[] a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.4-1.

7.2.11 Core Map Display

[] a,c

R7.2.11-1 [] a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), Table 2.6-1 and R2.6.3.1-1 (guidance).

R7.2.11-2 [] a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.5-2.

R7.2.11-3 [] a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.5-2.

R7.2.11-4 [] a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.5-5.

R7.2.11-5 [] a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.5-1, R2.6.2.2.5-2, and R2.6.3.1-9.

R7.2.11-6

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.5-3.

R7.2.11-7

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.5-4.

7.2.12 RCS Display

The RCS Display page will show a graphical depiction of the reactor coolant system indicating important temperatures, pressures, and levels.

R7.2.12-1

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), Table 2.6-1 and R2.6.3.1-1 (guidance).

R7.2.12-2

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.9-1 and engineering judgment to match to other RCS display pages for Common Q PAMS.

R7.2.12-3

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.9-1 and engineering judgment to match to other RCS display pages for Common Q PAMS.

R7.2.12-4

a,c

Rationale: Engineering judgment to match to other reactor vessel level graphical depictions in the Watts Bar 2 Common Q PAMS.

R7.2.12-5

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.9-1.

R7.2.12-6

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.9-1 and R2.6.3.1-9.

R7.2.12-7

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.9-1 and R2.6.3.1-9 as well as engineering judgment to provide information available on Watts Bar Unit 1 PAMS.

R7.2.12-8

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.9-1.

R7.2.12-9

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.9-2.

7.2.13 Trends

R7.2.13-1

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), Table 2.6-1 and R2.6.3.1-1 (guidance).

R7.2.13-2

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.10-1.

R7.2.13-3

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.10-1.

R7.2.13-4

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.10-1.

a,c

R7.2.13-5

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.10-5.

R7.2.13-6

a,c

R7.2.13-7

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.10-7.

R7.2.13-8

a,c

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Rationale: Engineering judgment to provide a reasonable amount of historical data for anticipated usage.

R7.2.13-9

a,c

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Rationale: Standard Common Q trend functionality.

R7.2.13-10

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.10-2, R2.6.2.2.10-3, and R2.6.2.2.10-4.

R7.2.13-11

a,c

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Rationale: Standard Common Q trend limitation.

R7.2.13-12

a,c

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Rationale: Standard Common Q trend limitation.

R7.2.13-13

a,c

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Rationale: Engineering judgment

R7.2.13-14

a,c

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Rationale: Engineering judgment

R7.2.13-15

a,c

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Rationale: Standard Common Q trend functionality.

R7.2.13-16

a,c

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Rationale: Standard Common Q trend functionality.

R7.2.13-17

a,c

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Rationale: Standard Common Q trend functionality.

R7.2.13-18

a,c

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Rationale: Standard Common Q trend functionality.

R7.2.13-19

a,c

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R7.2.13-20

a,c

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Rationale: Standard Common Q trend functionality.

R7.2.13-21

a,c

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Rationale: Engineering judgment

R7.2.13-22

a,c

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Rationale: Engineering judgment

7.2.14 System Events

R7.2.14-1

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), Table 2.6-1 and R2.6.3.1-1 (guidance).

R7.2.14-2

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.1-1, R2.6.2.2.11-1, and 00000-ICE-30156 (Reference 15), subsection 2.6.2.2.2.

R7.2.14-3

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.11-1, and 00000-ICE-30156 (Reference 15), subsection 2.6.2.2.2.

R7.2.14-4

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.1-1, R2.6.2.2.12-1, and 00000-ICE-30156 (Reference 15), subsection 2.6.2.2.8.

R7.2.14-5

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.12-1, and 00000-ICE-30156 (Reference 15), subsection 2.6.2.2.8.

R7.2.14-6

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.12-1, R2.6.3.2-1, and 00000-ICE-30156 (Reference 15), subsection 2.6.2.2.8.

7.2.15 FPD Status List

R7.2.15-1

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), Table 2.6-1 and R2.6.3.1-1 (guidance).

R7.2.15-2

[The FPD Status List Display page requirements defined in subsection 2.6.2.2.3 of 00000-ICE-30156, "System Requirements Specification for the Common Q Post Accident Monitoring System" (Reference 15) shall apply.]

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.1-1 and R2.6.2.2.13-1, and 00000-ICE-30156, (Reference 15), subsection 2.6.2.2.3.

7.2.16 Alarms

R7.2.16-1

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), Table 2.6-1, R2.6.3.1-1 (guidance), and R2.6.3.2-1.

R7.2.16-2

[The alarm processing requirements defined in subsection 2.6.2.4 of 00000-ICE-30156, "System Requirements Specification for the Common Q Post Accident Monitoring System" (Reference 15) shall apply.]

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.4-1, R2.6.3.2-1, and 00000-ICE-30156 (Reference 15), subsection 2.6.2.4.

R7.2.16-3

[The Alarm List Display page requirements defined in subsection 2.6.2.2.1 of 00000-ICE-30156, "System Requirements Specification for the Common Q Post Accident Monitoring System" (Reference 15) shall apply.]

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.1-1, R2.6.2.2.14-1, R2.6.3.2-1, and 00000-ICE-30156 (Reference 15), subsection 2.6.2.2.1.

R7.2.16-4

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.14-1, R2.6.3.2-1, and 00000-ICE-30156 (Reference 15), subsection 2.6.2.2.1.

R7.2.16-5

[The Alarm Log Display page requirements defined in subsection 2.6.2.2.9 of 00000-ICE-30156, "System Requirements Specification for the Common Q Post Accident Monitoring System" (Reference 15) shall apply.]

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.1-1, R2.6.2.2.15-1, R2.6.3.2-1, and 00000-ICE-30156 (Reference 15), subsection 2.6.2.2.9.

R7.2.16-6

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.15-1, R2.6.3.2-1, and 00000-ICE-30156 (Reference 15), subsection 2.6.2.2.9.

R7.2.16-7

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.15-1, R2.6.3.2-1, and 00000-ICE-30156 (Reference 15), subsection 2.6.2.2.9.

7.2.17 System Health Display

R7.2.17-1

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), Table 2.6-1 and R2.6.3.1-1 (guidance).

R7.2.17-2

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.16-1, and 00000-ICE-30156 (Reference 15), subsection 2.6.2.2.17.

R7.2.17-3

a,c



Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.16-1, and 00000-ICE-30156 (Reference 15), subsection 2.6.2.2.17.

R7.2.17-4

a,c



Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2-11.

R7.2.17-5

a,c



Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.9.5-1.

R7.2.17-6

a,c



Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.16-1, R2.6.3.1-9, and R2.9.5-1.

R7.2.17-7

a,c



Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.16-1, R2.7-2, and R2.9.3-1.

R7.2.17-8

a,c



Rationale: Engineering Judgment

R7.2.17-9

a,c



Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.16-2.

R7.2.17-10

a,c



Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.9.2-5.

R7.2.17-11

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.9.2-3.

7.2.18 CRC and System Info

R7.2.18-1

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), Table 2.6-1 and R2.6.3.1-1 (guidance).

R7.2.18-2

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.16-3.

R7.2.18-3

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.16-3.

R7.2.18-4

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.16-3.

R7.2.18-5

a,c

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Rationale: Engineering Judgment

R7.2.18-6

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.16-3.

7.2.19 Setpoint Display

[] a,c

R7.2.19-1

[] a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), Table 2.6-1 and R2.6.3.1-1 (guidance).

R7.2.19-2

[] a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.1-1 and R2.6.2.2.17-1, and 00000-ICE-30156 (Reference 15), subsection 2.6.2.2.4.

R7.2.19-3

[] a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.17-2.

R7.2.19-4

[The setpoint requirements in 00000-ICE-30156, "System Requirements Specification for the Common Q Post Accident Monitoring System" (Reference 15), subsection 2.6.2.2.6 shall apply.]

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.1-1 and R2.6.2.2.17-3, and 00000-ICE-30156 (Reference 15), subsection 2.6.2.2.6.

7.2.20 Bypass Display

R7.2.20-1

[] a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), Table 2.6-1 and R2.6.3.1-1 (guidance).

R7.2.20-2

[] a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.1-1 and R2.6.2.2.18-1, and 00000-ICE-30156 (Reference 15), subsection 2.6.2.2.5.

R7.2.20-3

[The point bypass requirements in 00000-ICE-30156, "System Requirements Specification for the Common Q Post Accident Monitoring System" (Reference 15), subsection 2.6.2.2.5 shall apply, except for the HJTC and UJTC bypass requirements.]

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.3.1-1, R2.6.2.1-1, and R2.6.2.2.18-1, and 00000-ICE-30156 (Reference 15), subsection 2.6.2.2.5.

R7.2.20-4

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a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.18-2.

R7.2.20-5

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a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), Table 2.6-5.

R7.2.20-6

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a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), Table 2.6-5.

7.2.21 Modify Setpoint/Bypass

R7.2.21-1

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a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), Table 2.6-1, R4.4-1, and R2.6.3.1-1 (guidance).

R7.2.21-2

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a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.2.1-1, R2.6.2.5-1, R2.6.3.1-1, R2.6.3.2-1, R3.1.6-1, R4.2.2-3, and R4.4-1.

R7.2.21-3

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a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.2.1-1, R2.6.2.5-1, R2.6.3.1-1, R2.6.3.2-1, R3.1.6-1, R4.2.2-3, and R4.4-1.

R7.2.21-4

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a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.2.1-3.

7.2.22 Functional Tests Display

R7.2.22-1

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), Table 2.6-1 and R2.6.3.1-1 (guidance).

R7.2.22-2

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.19-1 and R2.6.2.2.19-2.

R7.2.22-3

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.19-1 and R2.6.2.2.19-2.

R7.2.22-4

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.19-1 and R2.6.2.2.19-2.

R7.2.22-5

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.19-1 and R2.6.2.2.19-2.

7.2.23 Annunciator Test Display

R7.2.23-1

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), Table 2.6-1 and R2.6.3.1-1 (guidance).

R7.2.23-2

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.3.2-1 and R2.6.3.3-2.

R7.2.23-3

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.19-3 and R2.6.3.3-2.

R7.2.23-4

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.19-3 and R2.6.3.3-2.

R7.2.23-5

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.19-3 and R2.6.3.3-2.

7.2.24 Display Pixel Test

R7.2.24-1

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), Table 2.6-1, R2.6.3.3-6, and R2.6.3.1-1 (guidance).

R7.2.24-2

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.19-4 and R2.6.3.3-6.

R7.2.24-3

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.19-5 and R2.6.2.2.19-6.

R7.2.24-4

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.19-7.

7.2.25 Saturation Margin Test Display

R7.2.25-1

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), Table 2.6-1 and R2.6.3.1-1 (guidance).

R7.2.25-2

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.2.1-1, R2.6.3.2-1, and R4.2.2-3.

R7.2.25-3

a,c

[

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.19-8 and R2.6.3.3-1.

R7.2.25-4

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.19-9.

R7.2.25-5

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.19-10.

R7.2.25-6

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.19-10.

R7.2.25-7

a,c

[

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Rationale: Engineering Judgment

R7.2.25-8

a,c

[

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Rationale: Engineering Judgment

7.2.26 Analog Output Test Display

R7.2.26-1

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), Table 2.6-1, R2.6.3.3-7, and R2.6.3.1-1 (guidance).

R7.2.26-2

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.2.1-1, R2.6.3.2-1, and R4.2.2-3.

R7.2.26-3

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.19-11.

R7.2.26-4

a,c

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Rationale: Engineering Judgment

R7.2.26-5

a,c

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Rationale: Engineering Judgment to ensure that test data is not mistaken for live data.

7.2.27 Maintenance Display

R7.2.27-1

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.20-1 and R2.6.3.1-1.

R7.2.27-2

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.20-2 and R2.6.2.2.20-5.

R7.2.27-3

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.20-6, R2.6.3.2-1, and R3.1.6-1.

R7.2.27-4

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.3.2-1. Additionally, this is the chosen implementation to indicate reboot button is enabled to support WNA-DS-01617-WBT-P, R2.6.2.2.20-6.

R7.2.27-5

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.20-2.

R7.2.27-6

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.20-2.

R7.2.27-7

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.20-2.

R7.2.27-8

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.20-2.

7.2.28 RVLIS Constants

R7.2.28-1

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), Table 2.6-1 and R2.6.3.1-1.

R7.2.28-2

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4.19-1 and R2.6.2.2.20-7.

R7.2.28-3

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4.19-2 and R2.6.2.2.20-7.

R7.2.28-4

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4.19-3 and R2.6.2.2.20-7.

R7.2.28-5

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4.19-4 and R2.6.2.2.20-7.

R7.2.28-6

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4.19-5.

R7.2.28-7

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.3.4.19-6.

7.2.29 Loading AC160 Software

a,c

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R7.2.29-1

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), Table 2.6-1, R2.6.3-2, R2.6.3.1-1, and R2.6.3.3-5.

R7.2.29-2

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.2.2-1, R2.6.3-1, R2.6.3.2-1, R2.6.3.3-5, R3.1.6-1, and R4.2.2-3.

R7.2.29-3

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.2.2-2, R2.6.3.2-1, and R4.2.2-3.

R7.2.29-4

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.3.3-4.

7.2.30 Input Monitoring

R7.2.30-1

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), Table 2.6-1 and R2.6.3.1-1.

R7.2.30-2

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.20-3.

R7.2.30-3

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.20-3.

R7.2.30-4

[] a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.20-4.

R7.2.30-5

[] a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R3.2.3-6.

R7.2.30-6

[DELETED]

7.2.31 Load and Save Addressable Constants

[] a,c

R7.2.31-1

[] a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), Table 2.6-1 and R2.6.3.1-1.

R7.2.31-2

[] a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.20-8 and R2.6.3.3-3.

R7.2.31-3

[] a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.20-9 and R2.6.3.3-3.

R7.2.31-4

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.20-11, R2.6.3.2-1, and R3.1.6-1.

7.2.32 Analog Output Selection

a,c

R7.2.32-1

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), Table 2.6-1 and R2.6.3.1-1.

R7.2.32-2

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.20-10, R4.3.1-4.

R7.2.32-3

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.20-11, R2.6.3.2-1, and R3.1.6-1.

R7.2.32-4

a,c

7.2.33 Modify Timeout/Modify Default

a,c

R7.2.33-1

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.21-2.

R7.2.33-2

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.21-1 and R2.6.2.2.21-3.

R7.2.33-3

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.21-1 and R2.6.2.2.21-4.

R7.2.33-4

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.21-3 (guidance).

R7.2.33-5

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.21-5.

7.2.34 Plant Computer Datalink Processing

a,c

R7.2.34-1

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R4.3.3-1.

R7.2.34-2

a,c

R7.2.34-3

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R4.3.3-3.

R7.2.34-4

a,c

[] a,c

R7.2.34-5

[] a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.2.1.2-5, R4.2.2-3, and R4.3.3-2.

Table 7.2-1. [

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$\mathbf{J}^{\mathbf{a,c}}$

a,c

[illegible]

J^{a,c}

a,c

[illegible]

1^{a,c}

a,c

[illegible]

Table 7.2-1. [

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a,c

Table 7.2-2. [

] ^{a,c}

a,c

a,c

a,c

[illegible]

$\mathbf{I}^{\mathbf{a,c}}$ [illegible]

$\mathbf{J}^{\mathbf{a,c}}$

a,c

[illegible]

Table 7.2-2. [

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a,c

R7.2.34-6

a,c

R7.2.34-7

a,c

R7.2.34-8

a,c

R7.2.34-9

a,c

R7.2.34-10

a,c

R7.2.34-11

a, c

R7.2.34-12

a,c

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7.2.35 Legend Bar

R7.2.35-1

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.1-7 and R2.6.3.1-3.

R7.2.35-2

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.1-6 and R2.6.3.1-2.

R7.2.35-3

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.1-6, R2.6.2.1-7, R2.6.3.1-2, and R2.6.3.1-3.

R7.2.35-4

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.1-8 and R2.6.3.1-4.

R7.2.35-5

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.1-8 and R2.6.3.1-4.

7.2.36 FPDS Heartbeat

The FPDS heartbeat is the heartbeat generated by the OM and the MTP FPDS.

R7.2.36-1

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.9.1-1.

R7.2.36-2

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.1-2, R2.6.3.1-10, and R2.9.1-1.

R7.2.36-3

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.1-4, R2.6.3.1-11, and R2.9.1-1.

R7.2.36-4

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.1-4, R2.6.3.1-11, and R2.9.1-1.

7.2.37 AC160 Heartbeat

R7.2.37-1

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.9.1-1.

R7.2.37-2

a,c

[The AC160 heartbeat shall be indicated in the form of a date and time.]

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.1-9 and R2.9.1-1.

R7.2.37-3

a,c

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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.1-3, R2.6.3.1-5, R2.6.3.1-6, and R2.9.1-1.

7.2.38 FPDS Shared Memory Database

a,c

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R7.2.38-1

a,c

Rationale: 00000-ICE-3238 (Reference 18), Section 3.4.2.

7.2.39 FE Keyswitch Interlock

a,c

7.2.40 FPDS System File Checker

a,c

R7.2.40-1

a,c

Rationale: 00000-ICE-3239 (Reference 9), Section 3.2.24.

R7.2.40-2

a,c

Rationale: 00000-ICE-3239 (Reference 9), Section 3.2.24.

R7.2.40-3

a,c

Rationale: 00000-ICE-3239 (Reference 9), Section 3.2.24.

R7.2.40-4

a,c

Rationale: 00000-ICE-3239 (Reference 9), Section 3.2.24.

R7.2.40-5

a,c

Rationale: 00000-ICE-3239 (Reference 9), Section 3.2.24.

R7.2.40-6

a,c

Rationale: 00000-ICE-3239 (Reference 9), Section 3.2.24.

7.2.41 FPDS Screen Savers

R7.2.41-1

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.3.1-7.

R7.2.41-2

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.2.2.21-5.

R7.2.41-3

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.3.1-7.

7.2.42 FPDS Software Development and Program Generation

a,c

R7.2.42-1

a,c

Rationale: 00000-ICE-30155 (Reference 7), subsection 2.1.

R7.2.42-2

a,c

Rationale: 00000-ICE-30155 (Reference 7), subsection 2.6.

R7.2.42-3

[The software generation procedure described in subsection 2.1.5.1 of 00000-ICE-3239, "Software Requirements Specification for the Common Q Generic Flat-Panel Display Software" (Reference 9) shall be followed for software development for the Watts Bar 2 OM and MTP FPDS.]

Rationale: 00000-ICE-3239 (Reference 9), subsection 2.1.5.1.

7.2.43 FPDS RS232 Serial Communications Port

R7.2.43-1

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.6.3.3-5.

7.2.44 Display Resolution Requirements

R7.2.44-1

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R3.2.3-1, R3.2.3-6, and R3.2.3-7.

R7.2.44-2

[DELETED]

R7.2.44-3

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R3.2.3-2 and R3.2.3-7.

R7.2.44-4

[DELETED]

R7.2.44-5

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R3.2.3-3, R3.2.3-4, R3.2.3-6, and R3.2.3-7.

7.2.45 FPDS Constraints

R7.2.45-1

[The constraints listed in Section 2.4 of 00000-ICE-3239, "Software Requirements Specification for the Common Q Generic Flat-Panel Display Software" (Reference 9) shall apply to the Watts Bar 2 OM and MTP FPDS.]

Rationale: 00000-ICE-3239 (Reference 9), Section 2.4.

7.2.46 FPDS Performance

R7.2.46-1

[The Watts Bar 2 PAMS FPDS software shall meet the performance requirements specified in Section 3.3 of 00000-ICE-3239, "Software Requirements Specification for the Common Q Generic Flat-Panel Display Software" (Reference 9).]

Rationale: 00000-ICE-3239 (Reference 9), Section 3.3.

7.2.47 FPDS Reliability

R7.2.47-1

[The Watts Bar 2 PAMS FPDS software shall meet the reliability requirements specified in Section 3.5.1 of 00000-ICE-3239, "Software Requirements Specification for the Common Q Generic Flat-Panel Display Software" (Reference 9).]

Rationale: 00000-ICE-3239 (Reference 9), Section 3.5.1.

R7.2.47-2

[] a,c

Rationale: 00000-ICE-3239 (Reference 9), Section 3.2.24.

7.2.48 FPDS Maintainability

R7.2.48-1

[The Watts Bar 2 PAMS FPDS software shall meet the maintainability requirements specified in Section 3.5.3 of 00000-ICE-3239, "Software Requirements Specification for the Common Q Generic Flat-Panel Display Software" (Reference 9).]

Rationale: 00000-ICE-3239 (Reference 9), Section 3.5.3.

7.2.49 FPDS Portability

R7.2.49-1

[The Watts Bar 2 PAMS FPDS software shall meet the portability requirements specified in Section 3.5.4 of 00000-ICE-3239, "Software Requirements Specification for the Common Q Generic Flat-Panel Display Software" (Reference 9).]

Rationale: 00000-ICE-3239 (Reference 9), Section 3.5.4.

7.2.50 FPDS Memory Constraints

a,c

7.2.51 FPDS Operations

The normal and special operations specific to the Watts Bar 2 PAMS FPDS are identified in Section 2.1.7 of 00000-ICE-3239, "Software Requirements Specification for the Common Q Generic Flat-Panel Display Software" (Reference 9).

a,c

7.2.52 FPDS Site Adaptation Requirements

This FPDS software is designed or selected specifically for the Watts Bar Unit 2 site and therefore there are no site-specific adaptations requirements.

7.2.53 FPDS User Characteristics

a,c

7.2.54 FPDS Assumptions and Dependencies

Refer to the Open Items list at the start of this document for any assumptions and dependencies applicable to these FPDS software requirements.

7.2.55 FPDS Apportioning of Requirements

All of the FPDS requirements listed in this document are applicable to the design of the FPDS and none of these requirements may be altered, omitted, or delayed.

7.2.56 FPDS Availability

The availability requirements for the FPDS are defined in subsection 7.1.24.

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7.2.57 Print Screen

R7.2.57-1

	a,c
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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.2.1.3-1.

R7.2.57-2

	a,c
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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.2.1-1 and R2.5.2.1.3-1

R7.2.57-3

	a,c
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Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.2.1-1 and R2.5.2.1.3-2.

R7.2.57-4

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.2.1-1 and R2.5.2.1.3-3.

R7.2.57-5

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.2.1-1 and R2.5.2.1.3-3.

R7.2.57-6

a,c

Rationale: WNA-DS-01617-WBT-P (Reference 17), R2.5.2.1.3-4

SECTION 8 SAFETY AND SECURITY REQUIREMENTS

8.1 SAFETY

00000-ICE-37727, "Post Accident Monitoring System Software Preliminary Hazard Analysis for the Common Q Phase 3 PAMS Project" (Reference 30) provides the Preliminary Hazards Analysis (PHA) pertaining to the generic software for the Watts Bar 2 PAMS.

8.2 SECURITY

8.2.1 Cyber Security

a,c

R8.2.1-1

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R8.2.1-2

a,c

Rationale: WNA-PD-00073-WBT (Reference 16), Section 16.6.

R8.2.1-3

a,c

Rationale: WNA-DS-01150-GEN (Reference 13), Section 2.3, "Design & Implementation Phase."

R8.2.1-4

a,c

Rationale: WNA-DS-01150-GEN (Reference 13), Section 2.3, "Design & Implementation Phase."

R8.2.1-5

a,c

Rationale: WNA-DS-01150-GEN (Reference 13), Section 2.3, "Design & Implementation Phase."

R8.2.1-6

a,c

Rationale: WNA-DS-01150-GEN (Reference 13), Section 2.3, "Design & Implementation Phase."

R8.2.1-7

a,c

Rationale: WNA-DS-01150-GEN (Reference 13), Section 2.3, "Design & Implementation Phase."

R8.2.1-8

a,c

Rationale: WNA-DS-01150-GEN (Reference 13), Section 2.3, "Design & Implementation Phase."

R8.2.1-9

a,c

Rationale: WNA-DS-01150-GEN (Reference 13), Section 2.3, "Design & Implementation Phase."

R8.2.1-10

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Rationale: WNA-DS-01150-GEN (Reference 13), Section 2.3, "Design & Implementation Phase."

R8.2.1-11

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Rationale: WNA-DS-01150-GEN (Reference 13), Section 2.3, "Design & Implementation Phase."

R8.2.1-12 [] a,c

Rationale: WNA-DS-01150-GEN (Reference 13), Section 2.3, "Design & Implementation Phase."

R8.2.1-13 [] a,c

Rationale: WNA-DS-01150-GEN (Reference 13), Section 2.3, "Design & Implementation Phase."

R8.2.1-14 [] a,c

Rationale: WNA-DS-01150-GEN (Reference 13), Section 2.3, "Design & Implementation Phase."

R8.2.1-15 [] a,c

Rationale: WNA-DS-01150-GEN (Reference 13), Section 2.3, "Design & Implementation Phase."

(Last Page of Section 8)

SECTION 9

PROGRAM WIDE DATABASE (PWD) USAGE

The PWD is not used in the Watts Bar 2 PAMS per the Project Plan, WNA-PD-00073-WBT (Reference 16).

(Last Page of Section 9)

Attachment 17

**Westinghouse Electric Company CAW-11-3102, Application for Withholding Proprietary
Information from Public Disclosure, WNA-SD-00239-WBT-P, Revision 4, "Nuclear
Automation Watts Bar 2 NSSS Completion Program I&C Projects, Software Requirements
Specification for the Post Accident Monitoring System" (Proprietary),
Dated February 10, 2011**



Westinghouse Electric Company
Nuclear Services
1000 Westinghouse Drive
Cranberry Township, Pennsylvania 16066
USA

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

Direct tel: (412) 374-4643
Direct fax: (724) 720-0754
e-mail: greshaja@westinghouse.com
Proj letter: WBT-D-2910

CAW-11-3102

February 10, 2011

**APPLICATION FOR WITHHOLDING PROPRIETARY
INFORMATION FROM PUBLIC DISCLOSURE**

Subject: WNA-SD-00239-WBT-P, Rev. 4, "Nuclear Automation Watts Bar Unit 2 NSSS Completion Program I&C Projects, Software Requirements Specification for the Post Accident Monitoring System" (Proprietary)

The proprietary information for which withholding is being requested in the above-referenced report is further identified in Affidavit CAW-11-3102 signed by the owner of the proprietary information, Westinghouse Electric Company LLC. The affidavit, which accompanies this letter, sets forth the basis on which the information may be withheld from public disclosure by the Commission and addresses with specificity the considerations listed in paragraph (b)(4) of 10 CFR Section 2.390 of the Commission's regulations.

Accordingly, this letter authorizes the utilization of the accompanying affidavit by Tennessee Valley Authority.

Correspondence with respect to the proprietary aspects of the application for withholding or the Westinghouse affidavit should reference this letter, CAW-11-3102, and should be addressed to J. A. Gresham, Manager, Regulatory Compliance, Westinghouse Electric Company LLC, Suite 428, 1000 Westinghouse Drive, Cranberry Township, Pennsylvania 16066.

Very truly yours,

A handwritten signature in black ink, appearing to read "J. A. Gresham".

J. A. Gresham, Manager
Regulatory Compliance

Enclosures

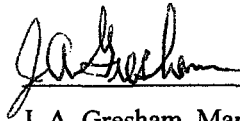
AFFIDAVIT

COMMONWEALTH OF PENNSYLVANIA:

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COUNTY OF BUTLER:

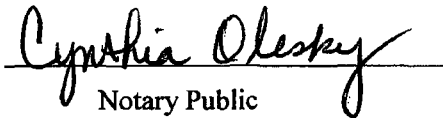
Before me, the undersigned authority, personally appeared J. A. Gresham, who, being by me duly sworn according to law, deposes and says that he is authorized to execute this Affidavit on behalf of Westinghouse Electric Company LLC (Westinghouse), and that the averments of fact set forth in this Affidavit are true and correct to the best of his knowledge, information, and belief:



J. A. Gresham, Manager

Regulatory Compliance

Sworn to and subscribed before me
this 10th day of February 2011


Notary Public

COMMONWEALTH OF PENNSYLVANIA

Notarial Seal
Cynthia Olesky, Notary Public
Manor Boro, Westmoreland County
My Commission Expires July 16, 2014
Member, Pennsylvania Association of Notaries

- (1) I am Manager, Regulatory Compliance, in Nuclear Services, Westinghouse Electric Company LLC (Westinghouse), and as such, I have been specifically delegated the function of reviewing the proprietary information sought to be withheld from public disclosure in connection with nuclear power plant licensing and rule making proceedings, and am authorized to apply for its withholding on behalf of Westinghouse.
- (2) I am making this Affidavit in conformance with the provisions of 10 CFR Section 2.390 of the Commission's regulations and in conjunction with the Westinghouse Application for Withholding Proprietary Information from Public Disclosure accompanying this Affidavit.
- (3) I have personal knowledge of the criteria and procedures utilized by Westinghouse in designating information as a trade secret, privileged or as confidential commercial or financial information.
- (4) Pursuant to the provisions of paragraph (b)(4) of Section 2.390 of the Commission's regulations, the following is furnished for consideration by the Commission in determining whether the information sought to be withheld from public disclosure should be withheld.
 - (i) The information sought to be withheld from public disclosure is owned and has been held in confidence by Westinghouse.
 - (ii) The information is of a type customarily held in confidence by Westinghouse and not customarily disclosed to the public. Westinghouse has a rational basis for determining the types of information customarily held in confidence by it and, in that connection, utilizes a system to determine when and whether to hold certain types of information in confidence. The application of that system and the substance of that system constitutes Westinghouse policy and provides the rational basis required.

Under that system, information is held in confidence if it falls in one or more of several types, the release of which might result in the loss of an existing or potential competitive advantage, as follows:

- (a) The information reveals the distinguishing aspects of a process (or component, structure, tool, method, etc.) where prevention of its use by any of

Westinghouse's competitors without license from Westinghouse constitutes a competitive economic advantage over other companies.

- (b) It consists of supporting data, including test data, relative to a process (or component, structure, tool, method, etc.), the application of which data secures a competitive economic advantage, e.g., by optimization or improved marketability.
- (c) Its use by a competitor would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing a similar product.
- (d) It reveals cost or price information, production capacities, budget levels, or commercial strategies of Westinghouse, its customers or suppliers.
- (e) It reveals aspects of past, present, or future Westinghouse or customer funded development plans and programs of potential commercial value to Westinghouse.
- (f) It contains patentable ideas, for which patent protection may be desirable.

There are sound policy reasons behind the Westinghouse system which include the following:

- (a) The use of such information by Westinghouse gives Westinghouse a competitive advantage over its competitors. It is, therefore, withheld from disclosure to protect the Westinghouse competitive position.
- (b) It is information that is marketable in many ways. The extent to which such information is available to competitors diminishes the Westinghouse ability to sell products and services involving the use of the information.
- (c) Use by our competitor would put Westinghouse at a competitive disadvantage by reducing his expenditure of resources at our expense.

- (d) Each component of proprietary information pertinent to a particular competitive advantage is potentially as valuable as the total competitive advantage. If competitors acquire components of proprietary information, any one component may be the key to the entire puzzle, thereby depriving Westinghouse of a competitive advantage.
 - (e) Unrestricted disclosure would jeopardize the position of prominence of Westinghouse in the world market, and thereby give a market advantage to the competition of those countries.
 - (f) The Westinghouse capacity to invest corporate assets in research and development depends upon the success in obtaining and maintaining a competitive advantage.
- (iii) The information is being transmitted to the Commission in confidence and, under the provisions of 10 CFR Section 2.390; it is to be received in confidence by the Commission.
- (iv) The information sought to be protected is not available in public sources or available information has not been previously employed in the same original manner or method to the best of our knowledge and belief.
- (v) The proprietary information sought to be withheld in this submittal is that which is appropriately marked in WNA-SD-00239-WBT-P, Rev. 4, "Nuclear Automation Watts Bar Unit 2 NSSS Completion Program I&C Projects, Software Requirements Specification for the Post Accident Monitoring System" (Proprietary) dated February 2011, for submittal to the Commission, being transmitted by Tennessee Valley Authority, Watts Bar Unit 2 letter and Application for Withholding Proprietary Information from Public Disclosure, to the Document Control Desk. The proprietary information as submitted by Westinghouse is that associated with software requirements for the Post Accident Monitoring System (PAMS) and may be used only for that purpose.

This information is part of that which will enable Westinghouse to:

- (a) Obtain NRC review of the Westinghouse Post Accident Monitoring System.

Further this information has substantial commercial value as follows:

- (a) Westinghouse plans to sell the use of similar information to its customers for purpose of licensing and implementing the Westinghouse Post Accident Monitoring System.
- (b) Its use by a competitor would improve their competitive position in the design and licensing of a similar product.
- (c) The information requested to be withheld reveals the distinguishing aspects of a methodology which was developed by Westinghouse.

Public disclosure of this proprietary information is likely to cause substantial harm to the competitive position of Westinghouse because it would enhance the ability of competitors to provide similar specifications and licensing defense services for commercial power reactors without commensurate expenses. Also, public disclosure of the information would enable others to use the information to meet NRC requirements for licensing documentation without purchasing the right to use the information.

The development of the technology described in part by the information is the result of applying the results of many years of experience in an intensive Westinghouse effort and the expenditure of a considerable sum of money.

In order for competitors of Westinghouse to duplicate this information, similar technical programs would have to be performed and a significant manpower effort, having the requisite talent and experience, would have to be expended.

Further the deponent sayeth not.

PROPRIETARY INFORMATION NOTICE

Transmitted herewith are proprietary and/or non-proprietary versions of documents furnished to the NRC in connection with requests for generic and/or plant-specific review and approval.

In order to conform to the requirements of 10 CFR 2.390 of the Commission's regulations concerning the protection of proprietary information so submitted to the NRC, the information which is proprietary in the proprietary versions is contained within brackets, and where the proprietary information has been deleted in the non-proprietary versions, only the brackets remain (the information that was contained within the brackets in the proprietary versions having been deleted). The justification for claiming the information so designated as proprietary is indicated in both versions by means of lower case letters (a) through (f) located as a superscript immediately following the brackets enclosing each item of information being identified as proprietary or in the margin opposite such information. These lower case letters refer to the types of information Westinghouse customarily holds in confidence identified in Sections (4)(ii)(a) through (4)(ii)(f) of the affidavit accompanying this transmittal pursuant to 10 CFR 2.390(b)(1).

COPYRIGHT NOTICE

The reports transmitted herewith each bear a Westinghouse copyright notice. The NRC is permitted to make the number of copies of the information contained in these reports which are necessary for its internal use in connection with generic and plant-specific reviews and approvals as well as the issuance, denial, amendment, transfer, renewal, modification, suspension, revocation, or violation of a license, permit, order, or regulation subject to the requirements of 10 CFR 2.390 regarding restrictions on public disclosure to the extent such information has been identified as proprietary by Westinghouse, copyright protection notwithstanding. With respect to the non-proprietary versions of these reports, the NRC is permitted to make the number of copies beyond those necessary for its internal use which are necessary in order to have one copy available for public viewing in the appropriate docket files in the public document room in Washington, DC and in local public document rooms as may be required by NRC regulations if the number of copies submitted is insufficient for this purpose. Copies made by the NRC must include the copyright notice in all instances and the proprietary notice if the original was identified as proprietary.

Tennessee Valley Authority
Letter for Transmittal to the NRC

The following paragraphs should be included in your letter to the NRC:

Enclosed are:

1. ___ copies of WNA-SD-00239-WBT-P, Rev. 4, "Nuclear Automation Watts Bar Unit 2 NSSS Completion Program I&C Projects, Software Requirements Specification for the Post Accident Monitoring System" (Proprietary)
2. ___ copies of WNA-SD-00239-WBT-NP, Rev. 4, "Nuclear Automation Watts Bar Unit 2 NSSS Completion Program I&C Projects, Software Requirements Specification for the Post Accident Monitoring System" (Non-Proprietary)

Also enclosed is the Westinghouse Application for Withholding Proprietary Information from Public Disclosure CAW-11-3102, accompanying Affidavit, Proprietary Information Notice, and Copyright Notice.

As Item 1 contains information proprietary to Westinghouse Electric Company LLC, it is supported by an affidavit signed by Westinghouse, the owner of the information. The affidavit sets forth the basis on which the information may be withheld from public disclosure by the Commission and addresses with specificity the considerations listed in paragraph (b)(4) of Section 2.390 of the Commission's regulations.

Accordingly, it is respectfully requested that the information which is proprietary to Westinghouse be withheld from public disclosure in accordance with 10 CFR Section 2.390 of the Commission's regulations.

Correspondence with respect to the copyright or proprietary aspects of the items listed above or the supporting Westinghouse affidavit should reference CAW-11-3102 and should be addressed to J. A. Gresham, Manager, Regulatory Compliance, Westinghouse Electric Company LLC, Suite 428, 1000 Westinghouse Drive, Cranberry Township, Pennsylvania 16066.