

1.8 Conformance with Standard Review Plan and Applicability of Codes and Standards

The information in this section of the reference ABWR DCD, including all subsections and tables, as modified by the STP Nuclear Operating Company Application to Amend the Design Certification rule for the U.S. Advanced Boiling Water Reactor (ABWR), "ABWR STP Aircraft Impact Assessment (AIA) Amendment Revision 3," dated September 23, 2010 is incorporated by reference with the following departures, standard supplement, and site-specific supplement (Table 1.8-21a).

STD DEP T1 2.14-1 (Table 1.8-20)

STD DEP T1 2.15-1 (Table 1.8-20)

STD DEP 1.8-1 (Table 1.8-7, Table 1.8-20, Table 1.8-21)

STD DEP 5A-1 (Table 1.8-20)

STD DEP 6C-1 (Table 1.8-20)

STD DEP 9.1-1 (Table 1.8-21)

STD DEP 9.5-1 (Table 1.8-20)

STD DEP 11.2-1 (Table 1.8-20)

STD DEP 11.4-1 (Table 1.8-20)

Revisions have been made to Table 1.8-20 and are summarized here. The STP 3 & 4 FSAR conforms with the following revisions of Regulatory Guides (RGs).

RG 1.75 Rev. 3

RG 1.82, Rev. 3

RG 1.84, Rev. 33

RG 1.136, Rev. 3

RG 1.142, Rev. 2

RG 1.143, Rev. 2 for the Radwaste Building, Radwaste Tunnel, and liquid and solid radwaste processing systems. Rev. 1 is incorporated by reference for the Turbine Building and offgas system.

RG 1.153, Rev. 1

RG 1.199, Rev. 0

RG 1.85 has been deleted (withdrawn).

Revisions have been made to Table 1.8-21 and are summarized here. The STP 3 & 4 FSAR conforms with the following Codes and Standards.

ACI 349, 1997

ASME BPVC, Section III, Division 2, 2001 Edition with 2003 Addenda

MIL STD-461E, 1999

MIL STD-462E, 1999

IEEE 279, 1971 has been replaced by IEEE 603, 1991

IEEE 384, 1992

IEEE 603, 1991

MIL STD-1478, 1991 has been cancelled by the Dept. of Defense, and has been deleted.

International Building Code, 2006

Additionally, the following standard supplemental information corrects an omission from DCD Table 1.8-21.

IEEE 665, 1995

Table 1.8-7 Summary of Differences from SRP Section 7

SRP Section	Specific SRP Acceptance Criteria	Summary Description of Difference	Subsection Where Discussed
7.1	Table 7.1: 1a IEEE 279, 4.19	RHR Annunciation at loop level.	7.3.2.3.2 (1) 7.3.2.4.2 (1) 7.4.2.3.2 (1)

Table 1.8-20 NRC Regulatory Guides Applicable to ABWR

RG No.	Regulatory Guide Title	Appl. Rev.	Issued Date	ABWR Applicable?	Comments
1.7	Control of Combustible Gas Concentrations in Containment Following a Loss-of-Coolant Accident	23	11/78 3/07	Yes	
[1.53]	Application of the Single-Failure Criterion to Safety Systems ⁽¹²⁾	0	6/73	Yes]	
[1.75]	Physical Independence of Electric Systems	2 3	9/78 2/05	Yes] ⁽⁴⁾	
1.118	Periodic Testing of Electric Power and Protection System ⁽¹²⁾	2	6/78	Yes	
[1.152]	Criteria for Programmable Digital Computer System Software in Safety-Related Systems of Nuclear Power Plants ⁽¹⁰⁾	0 2	11/85 1/06	Yes] ⁽⁴⁾	
1.168	Verification, Validation, Reviews and Audits for Digital Computer Software Used in Safety Systems of Nuclear Power Plants	1	2004	Yes	
1.169	Configuration Management Plans for Digital Computer Software Used in Safety Systems of Nuclear Power Plants	0	9/97	Yes	
1.170	Software Test Documentation for Digital Computer Software Used in Safety Systems of Nuclear Power Plants	0	9/97	Yes	
1.171	Software Unit Testing for Digital Computer Software Used in Safety Systems of Nuclear Power Plants	0	9/97	Yes	
1.172	Software Requirements Specifications for Digital Computer Software Used in Safety Systems of Nuclear Power Plants	0	9/97	Yes	
1.173	Developing Software Life Cycle Process for Digital Computer Software Used in Safety Systems of Nuclear Power Plants	0	9/97	Yes	
1.180	Guidelines for Evaluating Electromagnetic and Radio-Frequency Interference in Safety-Related Instrumentation and Control Systems Instrumentation and Control Systems ⁶⁽¹¹⁾	1	10/03	Yes	
1.209	Guidelines for Environmental Qualification of Safety-Related Computer-Based Instrumentation and Control Systems in Nuclear Power Plants	0	03/07	Yes	
1.82	Water Sources for Long-Term Recirculation Cooling Following Loss-of-Coolant Accident	4 3	11/85 11/03	Yes	

Table 1.8-20 NRC Regulatory Guides Applicable to ABWR (Continued)

1.199	Anchoring Components and Structural Supports in Concrete	0	11/03	Yes	
[1.84	<i>Design and Fabrication Code Case Acceptability, ASME Section III, Division 1</i>	27 33	11/90 8/05	Yes] ⁽¹⁾	
1.85	Materials Code Case Acceptability, ASME Section III, Division 1	27	11/90	Yes	
1.108	<i>Periodic Testing of Diesel Generator Units Used as Onsite Electric Power Systems at Nuclear Power Plants</i>	4	8/77 sup ersede d	Yes	Replaced by RG. 1.9
1.136	Materials, Construction, and Testing of Concrete Containments (Articles CC-1000, -2000, and -4000 through -6000 of the "Code for Concrete Reactor Vessels and Containment")	2 3	7/81 3/07	Yes	
1.142	Safety-Related Concrete Structures for Nuclear Power Plants (Other Than Reactor Vessels and Containments)	4 2	11/81 11/01	Yes	
1.143	<i>Guidance for Radioactive Waste Management Systems, Structures, and Components Installed in Light-Water-Cooled Nuclear Power Plants</i>	1	10/79	Yes	(Rev 1 - incorporated by reference from the DCD)
		2	11/01	Yes	(Rev 2 - RWB, radwaste pipe tunnel, and liquid and solid waste management systems)
1.150	Ultrasonic Testing of Reactor Vessel Welds During Preservice and Inservice Examinations	4	2/83	yes	
[1.153	<i>Criteria for Power, Instrumentation, and Control Portions of Safety Systems</i>	0 1	12/85 6/96	Yes] ⁽⁴⁾	
1.189	Fire Protection for Operating Nuclear Power Plants	1	3/2007	Yes	
1.189	Fire Protection for Operating Nuclear Power Plants	2	10/2009	Yes	Only as it applies to Single and Multiple Spurious Operation Analysis

- 5 The Common Q Digital Platform was submitted for generic use and was approved for reference as described in Topical Report WCAP-16097-P-A, Revision 0, "Common Qualified Platform Topical Report." This topical report includes the SERs dated August 11, 2000, June 22, 2001, and February 4, 2003, and is consistent with the referenced Regulatory Guide revisions identified in the comments. The Westinghouse "Software Program Manual for Common Q Systems" (SPM), WCAP-16096-NP-A also incorporates standards and Regulatory Guide requirements. The requirements that this platform were licensed to are submitted as an acceptable alternate to current requirements based on the original NRC review and SERs.
- 6 RG 1.180 endorses IEEE 1050-1996. The digital instrumentation and controls systems conform to IEEE 1050-2004 as shown in Table 1.8-21.
- 7 RG 1.209 endorses IEEE 323-2003. The ELCS conforms to IEEE 323-1983 as discussed in Note 5.

Table 1.8-21 Industrial Codes and Standards(*) Applicable to ABWR

Code or Standard Number	Year	Title
American Concrete Institute (ACI)		
[349 ^(†)	1980 1997	Code Requirements for Nuclear Safety-Related Concrete Structures] ⁽¹⁾⁽¹³⁾
American Society of Mechanical Engineers (ASME)		
NOG-1	2004	Rules for Construction of Overhead and Gantry Cranes
[SEC III	1989	BPVC Section III, Division 1 , Rules for Construction of Nuclear Power Plant Components] ⁽⁶⁾⁽⁹⁾
[Sec III	2001 with 2003 Addenda	BPVC Section III, Division 2 , Rules for Construction of Nuclear Power Plant Components] ⁽⁸⁾
Institute of Electrical and Electronics Engineers (IEEE)		
7-4.3.2	1982 2003	Standard Criteria for Digital Computers Used in Safety Systems of Nuclear Power Generation Stations
[279	1971	Criteria for Protection Systems for NPGS] ⁽³⁾⁽⁴⁾
[323 [†]	1974	Qualifying Class IE Equipment for NPGS] ⁽³⁾⁽⁴⁾⁽⁷⁾⁽¹²⁾
[338 [†]	1977	Criteria for the Periodic Surveillance Testing of NPGS Safety Systems] ⁽³⁾⁽⁹⁾⁽¹²⁾
379 [†]	1977	Standard Application of the Single-Failure Criterion to NPGS Safety Systems] ⁽¹²⁾
[384 ^(†)	1981 1992	Criteria for Independence of Class 1E Equipment and Circuits] ⁽³⁾
[603 ^(†)	1980 1991	IEEE Standard Criteria for Safety Systems for Nuclear Power Generating Stations, <u>including the corrective sheet dated January 30, 1995</u>] ⁽³⁾⁽⁴⁾
665	1995	IEEE Guide for Generating Station Grounding
[828 [†]	1983 1990	Standard for Software Configuration Management Plans] ⁽³⁾⁽⁴⁾
[830 [†]	1984 1993	Recommended Practice for Software Requirements Specifications] ⁽³⁾⁽⁴⁾
1008	1987	Standard for Software Unit Testing
[1012 [†]	1986 1998	Standard for Software Verification and Validation] ⁽³⁾⁽⁴⁾
1028	1997	Standard for Software Reviews and Audits
[1050	1989 2004	Guide for Instrumentation and Control Equipment Grounding in Generating Stations] ⁽³⁾⁽⁴⁾
1074	1995	Standard for Developing Software Life Cycle Processes
U.S. Military (MIL)		

Table 1.8-21 Industrial Codes and Standards^(*) Applicable to ABWR (Continued)

[STD-461 E	1987 1999	<i>Electromagnetic Emission and Susceptibility Requirements for the Control of Electromagnetic Interference]</i> ⁽³⁾⁽⁴⁾
[STD-462 E	1967 1999	<i>Measurement of Electromagnetic Interference Characteristics]</i> ⁽³⁾⁽⁴⁾
[STD-1478	1991	<i>Task Performance Analysis]</i> ⁽⁶⁾
Others		
[IEC 801-2	1991	<i>Electronic Capability for Industrial Process Measurement and Control Equipment]</i> ⁽³⁾
[IEC 61000	2001	Electromagnetic Compatibility (EMC) - Part 4-2: Testing and Measurement Techniques - Electrostatic Discharge Immunity Test] ⁽³⁾
UBC	1991	<i>Uniform Building Code</i>
IBC	2006	International Building Code

Notes:

- (1) See Subsection 3.8.3.2 for restriction to use of these.
- (3) See Section 7A.1(1).
- (4) See Section 7A.1(2).
- (6) See Subsection 3.8.1.1.1 for specific restriction of change to this edition.
- (8) See Subsection 3.9.1.7 for specific restriction of change to this edition in application to piping design. See Table 3.2-3 for the restricted Subsections of this Code as applied to piping design only.
- (10) The DI&C Systems will be evaluated for compliance with revised cyber security guidance being developed by the NRC and industry as computer security guidance to be issued as Secure Development and Operational Environment (SDOE) in the context of requirements in Revision 3 to Regulatory Guide 1.152 (DG-1249).
- (11) RG 1.180 endorses IEEE 1050-1996. The digital instrumentation and controls systems conform to IEEE 1050-2004 as shown in Table 1.8-21.
- (12) The DI&C Systems will comply with current RG 1.53 Rev. 2 (11/03), RG 1.118 Rev. 3 (1995), IEEE 323-2003, IEEE 338-1987, and IEEE 379-2000.
- (13) ACI 349-97 references ASTM C289-81 for testing potential reactivity of aggregates (chemical). Additional testing per ASTM C1260 and C1293 will be performed.

(*) The listing of a code or standard does not necessarily mean that it is applicable in its entirety.

(†) Also an ANSI code (i.e. ANSI/ASME, ANSI/ANS, ANS/IEEE etc.).

Table 1.8-21a Codes and Standards for Site-Specific Systems

Code or Standard Number	Year	Title
American Concrete Institute (ACI)		
349	1997	Code Requirements for Nuclear Safety-Related Concrete Structures
350	2001	Code Requirements for Environmental Engineering Concrete Structures, and Commentary (ACI 350R-01)
350.1	2001	Tightness Testing of Environmental Engineering Concrete Structures, and Commentary (ACI 350.1R-01)
American Institute of Steel Construction (AISC)		
N690 [†]	1994 [*]	Specifications for the Design, Fabrication and Erection of Steel Safety-Related Structures for Nuclear Facilities * (including Supplement 2)
American Nuclear Society (ANS)		
2.8	1992	Determining Design Basis Flooding at Power Reactor Sites
3.11	2005	Determining Meteorological Information at Nuclear Facilities
5.1	2005	Decay Heat Power in Light Water Reactors
40.37	200x	Mobile Radioactive Waste Processing Systems
55.1	1992	Solid Radwaste Processing System for Light Water Reactor Plants
55.6	1993	Liquid Radioactive Waste Processing System for Light Water Reactor Plants
57.1	2005	Design Requirements for Light Water Reactor Fuel Handling Systems
57.2	1983	Design Requirements for Light Water Reactor Spent Fuel Storage Facilities at Nuclear Power Plants
57.3	1983	Design Requirements for New Fuel Storage Facilities at Light Water Reactor Plants
American Petroleum Institute (API)		
610	2004	Centrifugal Pumps for Petroleum, Petrochemical and Natural Gas Industries
620	2002	Design and Construction of Large, Welded, Low-Pressure Storage Tanks (with June 2004 Addenda)
650	2007	Welded Steel Tanks for Oil Storage, Addendum 3
674	1995	Positive Displacement Pumps - Reciprocating
675	1994	Positive Displacement Pumps – Controlled Volume
American Society of Civil Engineers (ASCE)		
4	1998	Seismic Analysis of Safety-Related Nuclear Structures (and Commentary)
43	2005	Seismic Design Criteria for Structures, Systems and Components Nuclear Facilities

Table 1.8-21a Codes and Standards for Site-Specific Systems (Continued)

Code or Standard Number	Year	Title
American Society of Civil Engineers / Structural Engineering Institute (ASCE/SEI)		
7	2005	Minimum Design Loads for Buildings and Other Structures
American Society of Mechanical Engineers (ASME)		
AG-1	1997	Code on Nuclear Air and Gas Treatment
B30.2	2005	Overhead and Gantry Cranes (Top Running Bridge, Single or Multiple Girder, Top Running Trolley Hoist)
B30.9	2006	Slings
B30.10	2005	Hooks
B30.11	2004	Monorails and Underhung Cranes
B30.16	2007	Overhead Hoists (Underhung)
B31.1	2004	Power Piping (Includes 2006 Addenda)
B31.3	2006	Process Piping
N13.1	1999	Guide to Sampling Airborne Radioactive Materials in Nuclear Facilities
N14.6	1993	Special Lifting Devices for Shipping Containers Weighing 10,000 Pounds (4500 kg) or More for Nuclear Materials
N510	1995	Testing of Nuclear Air-Cleaning Systems
NOG-1	2004	Rules for Construction of Overhead and Gantry Cranes
BPVC Sec III	2001	Rules for Construction of Nuclear Power Plant Components (including 2003 Addenda)
BPVC Sec VIII	2004	Rules for Construction of Pressure Vessels
BPVC Sec XI	2004	Rules for Inservice Inspection of Nuclear Power Plant Components
OM	2004	Code for Operation and Maintenance of Nuclear Power Plants
OM-S/G	2007	Requirements for Preoperational and Initial Startup Vibration Testing of Nuclear Power Plant Piping Systems
Institute of Electrical and Electronics Engineers (IEEE)		
384	1992	Criteria for Independence of Class 1E Equipment and Circuits
603	1991	IEEE Standard Criteria for Safety Systems for Nuclear Power Generating Stations
666	2007	Design Guide for Electric Power Service Systems for Generating Stations
C62.23	1995	Application Guide for Surge Protection of Electric Generating Plants

Table 1.8-21a Codes and Standards for Site-Specific Systems (Continued)

Code or Standard Number	Year	Title
International Code Council (ICC)		
IPC	2003	International Plumbing Code