EUROPEAN UTILITY REQUIREMENTS FOR LWR NUCLEAR POWER PLANTS

VOLUME 2

GENERIC AND NUCLEAR ISLAND REQUIREMENTS

CHAPTER 10

INSTRUMENTATION & CONTROL AND HUMAN-MACHINE INTERFACE

Revision E

December, 2016

List and status of the sections of the Chapter 2.10 Revision E of December, 2016

INSTRUMENTATION & CONTROL AND HUMAN-MACHINE INTERFACE

EUROPEAN UTILITY REQUIREMENTS FOR LWR NUCLEAR POWER PLANTS

List and status of the sections of the Chapter 2.10 Revision E of December, 2016

INSTRUMENTATION & CONTROL AND HUMAN-MACHINE INTERFACE

Section Number		Section Title	Last change
2.10	6.4.2.3.1	General	E-00
2.10	6.4.2.3.2	Main Control Room	E-00
2.10	6.4.2.3.3	Emergency Control Room	E-00
2.10	6.4.2.3.4	Emergency Centre	E-00
2.10	6.4.2.3.5	Technical Support Centre	E-00
2.10	6.4.2.3.6	I&C Service Centre	E-00
2.10	6.4.2.3.7	Maintenance management room	E-00
2.10	6.4.2.3.8	Oral communication	E-00
2.10	6.4.2.3.9	HMI design general targets	E-00
2.10	6.4.2.3.10	Design of alarms	E-00
2.10	6.4.2.3.11	Operating instructions	E-00
2.10	6.4.2.3.12	Recording, archiving and reports	E-00
2.10	6.4.2.3.13	Operating aid	E-00
2.10	6.4.2.3.14	Diagnostics	E-00
2.10	6.4.2.3.15	Technology of HMI	E-00
2.10	6.4.2.3.16	Human factor techniques and HMI ergonomics	E-00
2.10	6.4.2.4	Data communication	E-00
2.10	6.4.2.5	Tools	E-00
2.10	6.4.2.5.1	General requirements	E-00
2.10	6.4.2.5.2	Software Tools	E-00
2.10	6.4.2.6	Defence against CCF	E-00
2.10	6.4.3	Assignment of functions to I&C systems	E-00
2.10	6.4.4	Required analysis	E-00
2.10	6.4.4.1	General	E-00
2.10	6.4.4.2	Assessment of reliability and defences against CCF	E-00
2.10	6.5	Overall planning	E-00
2.10	6.5.1	General	E-00
2.10	6.5.2	Overall quality assurance programs	E-00
2.10	6.5.3	Overall security plan	E-00
2.10	6.5.4	Overall I&C integration and commissioning	E-00
2.10	6.5.5	Overall operation plan	E-00
2.10	6.5.6	Overall maintenance plan	E-00
2.10	6.5.7	Planning of training	E-00
2.10	6.6	Output documentation of overall planning	E-00

EUROPEAN UTILITY REQUIREMENTS FOR LWR NUCLEAR POWER PLANTS

List and status of the sections of the Chapter 2.10 Revision E of December, 2016

INSTRUMENTATION & CONTROL AND HUMAN-MACHINE INTERFACE

Section Number		Section Title	Last change
2.10	6.6.1	General	E-00
2.10	6.6.2	Architectural design documentation	E-00
2.10	6.6.3	Functional assignment documentation	E-00
2.10	7	Sytem life cycle	E-00
2.10	7.1	General	E-00
2.10	7.2	Requirements	E-00
2.10	7.2.1	General	E-00
2.10	7.2.2	System requirements specification	E-00
2.10	7.2.2.1	General	E-00
2.10	7.2.2.2	Functions	E-00
2.10	7.2.2.2.1	General	E-00
2.10	7.2.2.2.2	Application functions	E-00
2.10	7.2.2.2.3	Service Functions	E-00
2.10	7.2.2.3	Design constraints	E-00
2.10	7.2.2.3.1	General	E-00
2.10	7.2.2.3.2	System architecture	E-00
2.10	7.2.2.3.2.1	Implementation	E-00
2.10	7.2.2.3.2.2	Redundancy	E-00
2.10	7.2.2.3.2.3	Independence Physical Separation	E-00
2.10	7.2.2.3.2.4	Single Failure Criterion	E-00
2.10	7.2.2.3.2.5	Power supply and grounding	E-00
2.10	7.2.2.3.3	Internal behaviour of the system	E-00
2.10	7.2.2.3.4	Self-supervision and tolerance to failures	E-00
2.10	7.2.2.3.5	Testability	E-00
2.10	7.2.2.3.6	Maintainability	E-00
2.10	7.2.2.4	Boundaries and interfaces with other systems and tools	E-00
2.10	7.2.2.5	Interfaces with users	E-00
2.10	7.2.2.6	Environmental conditions	E-00
2.10	7.2.2.7	Qualification	E-00
2.10	7.2.3	System specification	E-00
2.10	7.2.3.1	General	E-00
2.10	7.2.3.2	Selection of pre-existing components	E-00
2.10	7.2.3.3	System architecture	E-00
2.10	7.2.3.3.1	General	E-01

EUROPEAN UTILITY REQUIREMENTS FOR LWR NUCLEAR POWER PLANTS

List and status of the sections of the Chapter 2.10 Revision E of December, 2016

INSTRUMENTATION & CONTROL AND HUMAN-MACHINE INTERFACE

Section Number		Section Title	Last change
2.10	7.2.3.3.2	Geographical distribution of subsystems (centralised decentralised)	E-00
2.10	7.2.3.3.3	Independence	E-00
2.10	7.2.3.3.4	Defence against propagation and side-effects of failures	E-00
2.10	7.2.3.4	Software specification	E-00
2.10	7.2.3.5	Assignment of the application functions in the system	E-00
2.10	7.2.4	System detailed design and implementation	E-00
2.10	7.2.4.1	General	E-00
2.10	7.2.4.2	Required analysis	E-00
2.10	7.2.4.2.1	Functional validation of the application functions requirements specification	E-00
2.10	7.2.4.2.2	Reliability assessment	E-00
2.10	7.2.5	System integration	E-00
2.10	7.2.6	System validation	E-00
2.10	7.2.7	System installation	E-00
2.10	7.2.8	System design modification	E-00
2.10	7.3	System planning	E-00
2.10	7.3.1	General	E-00
2.10	7.3.2	System quality assurance plan	E-00
2.10	7.3.2.1	General	E-00
2.10	7.3.2.2	System verification plan	E-00
2.10	7.3.2.3	System configuration management plan	E-00
2.10	7.3.2.4	Fault resolution procedures	E-00
2.10	7.3.3	System security plan	E-00
2.10	7.3.4	System integration plan	E-00
2.10	7.3.5	System validation plan	E-00
2.10	7.3.6	System installation plan	E-00
2.10	7.3.7	System operation plan	E-00
2.10	7.3.8	System maintenance plan	E-00
2.10	7.4	Output documentation of system planning	E-00
2.10	7.4.1	General	E-00
2.10	7.5	System qualification	E-00
2.10	7.5.1	General	E-00
2.10	7.5.2	Generic and application-specific qualification	E-00
2.10	7.5.3	Qualification plan	E-00
2.10	7.5.3.1	General	E-00

EUROPEAN UTILITY REQUIREMENTS FOR LWR NUCLEAR POWER PLANTS

List and status of the sections of the Chapter 2.10 Revision E of December, 2016

INSTRUMENTATION & CONTROL AND HUMAN-MACHINE INTERFACE

Section Number		Section Title	Last change
2.10	7.5.3.2	Functional and environmental qualification	E-00
2.10	7.5.3.2.1	General	E-00
2.10	7.5.3.2.1.1	Suitability and correctness	E-00
2.10	7.5.3.2.1.2	Environmental qualification	E-00
2.10	7.5.3.2.1.3	Qualification for the effects of internal and external hazards	E-00
2.10	7.5.3.2.1.4	Electromagnetic qualification	E-00
2.10	7.5.3.2.2	Equipment Qualification methods	E-00
2.10	7.5.3.2.2.2	Additional qualification of interconnected systems	E-00
2.10	7.5.3.2.2.3	Analysis	E-00
2.10	7.5.3.2.2.4	Reliability demonstration	E-00
2.10	7.5.3.2.2.5	Operating experience	E-00
2.10	7.5.3.3	Software evaluation and assessment	E-00
2.10	7.5.4	Additional qualification of interconnected systems	E-00
2.10	7.5.5	Maintaining qualification	E-00
2.10	7.5.6	Documentation	E-00

EUROPEAN UTILITY REQUIREMENTS FOR LWR NUCLEAR POWER PLANTS