

Translation of some provisions of the Technical Specification into English.

If a difference in their content is found, the Slovak language version given in the Technical Specification document shall prevail.

1. TERMS AND ABBREVIATIONS

1.1. TERMS

Contractor (Supplier)

A natural person or a legal entity with required technical competences and valid certification for execution of activities making the subject of performance after conclusion of the contract for which the TS has been developed.

Proposal for Change

An internal document describing a request for change of the NPP design.

Operating documentation

Documentation and records contained in "quality system" directives, mainly technological procedures, actions, manuals, operative diagrams.

Elementary system

A set of machines, equipment and inventory making a separate technological process of basic manufacturing technology or a complete technological process of auxiliary production and put into operation continuously.

Design documentation

A prepared set of documents for implementation of construction or technical changes in relation to current condition based on a request elaborated in the Proposal for Change and in compliance with valid regulations needed for implementation of change of equipment, technological systems, constructions and software.

Designer

A person with relevant education and certificates for designing.

Accompanying technical documentation

A set of documents proving quality of supplied equipment, correctness, reliability and safety of operation of the equipment (quality and completeness certificate, technical inspection report of classified equipment, passports, IQAP, technical conditions etc.).

Classified equipment

System, structure, component or part thereof, including their software, important for nuclear safety of the nuclear installation, classified in safety classes (Regulation of UJD SR No. 431/2011) based on their importance for nuclear safety and safety function of the system they are part of, and significance of their eventual failure.

Classified technical equipment

System, structure, component or part thereof, including their software, important from point of their classification based on endangering degree pursuant to Regulation of the MPSVaR SR No. 508/2009 Coll.

Record

A document describing reached results or giving an evidence of performed activities.

Change

Replacement of existing status of equipment, system, component, structure, construction, software, documentation, etc., by new different status with different parameters or use properties.

1.2. ABBREVIATIONS

ASDR	– connection to the dispatching using IEC104
I&C	– automated systems of control of technological processes (instrumentation & control)
MCR	– main control room
OHS	– occupational health and safety
SC	– safety class
DPS	– elementary subsystem
ABD	– as-built documentation
EDG	– emergency diesel generator
EMC	– electromagnetic compatibility
ESFAS	– engineered safety features actuation system
ESTE	– HW and SW in ECC ensuring calculation of the event development based on the weather conditions
FDPS	– fire detection and protection system
DRTS	– diverse reactor trip system
ABD-DC	– as-built documentation of a design change
MO34	– Mochovce Units 3 & 4 completion
EMC	– electromagnetic compatibility
EN	– European Norm
GO	– general overhaul
HMG	– time schedule
ECC	– emergency control centre
HW	– hardware
IPR	– investment project
NPP	– nuclear power plant
NI	– nuclear Installation
MPSVaR SR	– Ministry of Labour, Social Affairs and Family of the Slovak Republic
MV SR	– Ministry of Interior of the Slovak Republic
MZ SR	– Ministry of Health of the Slovak Republic
MŽP SR	– Ministry of Environment of the Slovak Republic
ECR	– emergency control room
PfC	– proposal for change
PAMS	– post accident monitoring system
PACS	– priority actuation control system
PAS	– process automation system
DD	– design documentation
ST CT	– commissioning test programme
ITP	– inspection and test plan
POSAR	– preoperational safety analysis report
PS	– elementary system
PU	– process unit

<i>DoC</i>	<i>– design of change</i>
<i>RAW</i>	<i>– radioactive waste</i>
<i>RCS</i>	<i>– reactor control system</i>
<i>RFSS</i>	<i>– representative full scope simulator</i>
<i>RRCS/RLS</i>	<i>– reactor rod control system/reactor limitation system</i>
<i>RTB</i>	<i>– reactor trip breaker</i>
<i>RTS</i>	<i>– reactor trip system</i>
<i>SAMS</i>	<i>– severe accident monitoring system</i>
<i>SAT</i>	<i>– site acceptance test</i>
<i>SASx</i>	<i>– safety automation system</i>
<i>SE</i>	<i>– Slovenské elektrárne, a.s.</i>
<i>SICS</i>	<i>– safety information control system</i>
<i>KKS</i>	<i>– uniform denomination system</i>
<i>SC</i>	<i>– seismic category</i>
<i>I&C</i>	<i>– instrumentation and control system</i>
<i>SO</i>	<i>– civil structure</i>
<i>TDDC</i>	<i>– technical and design documentation centre</i>
<i>ATD</i>	<i>– accompanying technical documentation</i>
<i>STN</i>	<i>– Slovak technical norm</i>
<i>SU</i>	<i>– server unit</i>
<i>SW</i>	<i>– software</i>
<i>T2000</i>	<i>– Unit control system</i>
<i>TCS/TPS</i>	<i>– turbine control system/turbine protection system</i>
<i>TXS</i>	<i>– Teleperm XS</i>
<i>TG</i>	<i>– turbine generator</i>
<i>TS</i>	<i>– technical specification</i>
<i>UED(SAT)</i>	<i>– system for simulation of 400 kV grid and SEPS dispatching</i>
<i>UJD SR</i>	<i>– Nuclear Regulatory Authority of the Slovak Republic</i>
<i>NPP CE</i>	<i>– nuclear power plant classified equipment</i>
<i>CfW</i>	<i>– contract for work</i>
<i>Coll.</i>	<i>– Collection of Laws</i>

2. BACKGROUND

2.1. AIM AND PURPOSE OF THE SUBJECT OF PERFORMANCE

The subject matter of the performance is an upgrade of the HW and SW parts of the representative full scope simulator (RFSS) for training of the staff, that is a part of technical equipment of the operator of the specialised facility and allows to carry out all work activities in the same way as they are carried out in the control room.

The subject matter of the performance includes also modifications of MO34 RFSS resulting from differences occurred between the reference Unit 3 and the MO34 simulator. The differences occurred during performance of works in Unit 3 that were not implemented in the simulator.

The document further describes also requirements to ensure the functionality, performance, reliability, resistance to the environment, and quality assurance, recommendations, interfaces to the electro profession systems, interfaces to the mechanical part and the civil part.

The aim of the project is a draft, configuration and delivery of all necessary HW and SW tools to assure conformity of RFSS with the reference Unit 3 and to assure training of MCR operative personnel for EMO34 in compliance with legislative requirements.

2.2. DESCRIPTION OF THE CURRENT STATUS AND CLASSIFICATION

RFSS is a facility for full scope simulation of the main control room and the emergency control room of Mochovce NPP Unit 3, including technology and equipment that can be controlled from the control room and that impact the behaviour of the nuclear unit. It consists of hardware and software.

Its task is to enable full scope training of the EMO34 main control room personnel, validation of regulations and possible verification of possibilities to implement technological changes.

The list of power plant systems with an impact on the MO34 simulator is in Annex No. 9.

The interface between the simulation model and the RFSS panels and boards is currently assured by a system of input/output modules using controllers with I/O cards. Controllers – Ethernet controller, type 7676-1 and I/O cards, type 7676-1 (128-bit digital output card) or 7674-1 (32 analogue channels)

Several differences has arisen in the Mochovce EMO34 site between the reference Unit (MO3 MCR) and the EMO34 simulator during the construction, and it is necessary to assure their implementation to arrange alignment of the reference Unit (MO3 MCR) with the EMO34 simulator.

The scope of not implemented changes is described in Annex No. 3 to this TS.

Affected elementary subsystems and civil structures

DPS, SO No.	DPS, SO name
	EMO34 full-scope simulator

Layout of existing equipment

The equipment affected by the change is located in the I&C building SO [REDACTED] in the following rooms: [REDACTED] server room.

Classification of existing equipment

The affected existing equipment is not included among classified equipment according to Regulation of UJD SR No. 430/2011.

From the aspect of Regulation of UJD SR No. 52/2006 on Professional Qualification, it is a specialised facility for training of professionally capable personnel of the NI.

In compliance with the MO34 Methodology "Requirements for Seismic Resistance Assessment of Structures, Systems and Components of Mochovce NPP Units 3&4", the affected equipment is classified in seismic category 2b.

The equipment is ranked among classified electrical equipment, class III B pursuant to Regulation of the Ministry of Labour, Social Affairs and Family No. 508/2009 Coll.

RFSS is not classified from the aspect of classification of function pursuant to STN EN 61226.

2.3. PLACE OF DELIVERY

Slovenské elektrárne, a.s., Nuclear Power Plant Mochovce, 935 39 Mochovce.

Mochovce Nuclear Power Plant is situated in south region of the Slovak Republic (Levice district) between Levice and Nitra, app. 120 km far from the capital Bratislava. There are local roads in the site which can be used for transport of material and working tools to structures affected by the change. Entry of persons, small materials and manual tools to the premises of RFSS and SO [REDACTED] is enabled through the main gatehouse. After entry to EMO12, there is free access to the I&C building.

Due to the nature of the works, it is not necessary to use or create any special transport routes. Existing transport routes and means will be used for disassembly of the original equipment and assembly of new equipment.

2.4. CHARACTERISTICS OF THE ENVIRONMENT

The place of performance is the MO34 simulator, the environmental parameters of the rooms affected by the change are stated in the report of the environment specification of SO 630/1-02 that makes Annex No. 2 to this TS.

No increased risk level in the field of environmental risks was identified for performance of works in the rooms of concern. The environment is defined as safe basic.

2.5. LEGAL REQUIREMENTS

In addition to the standard legislation of the SR and the EU, the solutions used within this project shall fulfil also the following specific legislation and safety guidelines.

1.	Design documentation shall be prepared pursuant to Act No. 541/2004 Coll. on peaceful use of nuclear energy (Atomic Law) and on amendment to and modification of certain acts.
2.	The OHS part shall be prepared pursuant to Act No. 124/2006 Coll. on occupational health and safety, and on amendment to and modification of certain acts.
3.	Act No. 350/2011 Coll. amending and altering Act No. 541/2004 Coll. on peaceful use of atomic energy (Atomic Act)
	Act No. 355/2007 Coll. on protection, support and development of the public health.
4.	Ordinance of the Government of the SR No. 387/2006 Coll. on requirements for provision of safety and medical marking at work
5.	Regulation of the Ministry of Labour, Social Affairs and Family of the SR No. 46/2014 Coll. amending the Regulation of the Ministry of Labour, Social Affairs and Family of the SR No. 147/2013 Coll. on details to provide for occupational health and safety at construction activities and related activities, and on details of professional capability for performance of certain activities.

6.	<i>Ordinance of the Government of the SR No. 391/2006 Coll. on minimum and medical requirements for workplace.</i>
7.	<i>Ordinance of the Government of the SR No. 392/2006 Coll. on minimum safety and medical requirements at use of working means.</i>
8.	<i>Ordinance of the Government of the SR No. 395/2006 Coll. on minimum requirements for provision and use of personal protective equipment.</i>
9.	<i>Regulation of the Ministry of Health of the SR No. 541/2007 Coll. laying down details of requirements for illumination at work.</i>
10.	<i>Regulation of the Ministry of Health of the SR No. 542/2007 Coll. on details of health protection against physical strain at work, mental work loading and sensor loading at work.</i>
11.	<i>Regulation of the Ministry of Health of the SR No. 99/2016 Coll. on details of health protection against heat and cold at work.</i>
12.	<i>Ordinance of the Government of the SR No. 276/2006 Coll. on minimum safety and medical requirements at work with display units.</i>
13.	<i>Ordinance of the Government of the SR No. 396/2006 Coll. on minimum safety and health requirements for a building site.</i>
14.	<i>Regulation of the Ministry of Labour, Social Affairs and Family of the SR No. 508/2009 Coll. on details to provide for occupational health and safety at work with pressure, lifting, electrical and gas technical equipment, and on technical equipment considered the classified technical equipment.</i>
15.	<i>Act No. 67/2001 Coll. Fire Protection Act.</i>
16.	<i>Regulation of the Ministry of Interior of the SR No. 121/2002 Coll. on fire prevention.</i>
17.	<i>Regulation of the Ministry of Interior No. 94/2004 Coll. on technical requirements for fire safety during construction and usage of buildings.</i>
18.	<i>Regulation of the Ministry of Interior of the SR No. 225/2012 Coll. amending and completing Regulation of the Ministry of Interior of the SR No. 94/2004 Coll. stating technical requirements for fire safety during construction and usage of buildings in the wording of Regulation of the Ministry of Interior of the SR No. 307/2007 Coll.</i>
19.	<i>Regulation of the Ministry of Interior of the SR No. 259/2009 Coll. amending and completing Regulation of the Ministry of Interior of the SR No. 121/2002 Coll. on fire prevention, in the wording of Regulation of the Ministry of Interior of the SR No. 591/2005 Coll.</i>
20.	<i>Act No. 126/2006 Coll. on public health service and on amendment to and modification of certain acts</i>
21.	<i>Ordinance of the Government of the SR No. 127/2016 Coll. on electromagnetic compatibility</i>
22.	<i>Act No. 79/2015 Coll on wastes and on amendment to and modification of certain acts., and its implementing decrees by the Ministry of Environment of the Slovak Republic No. 365/2015 Coll. on the Execution of Certain Provisions of the Waste Act and No. 365/2015 Coll., which establishes the Waste Catalogue.</i>
23.	<i>Act No. 230/2016 Coll. amending Act No. 79/2015 Coll. on waste and on amendment to and modification of certain acts as amended</i>

24.	<i>Act No. 133/2013 Coll. on construction products and on amendment to and modification of certain acts.</i>
25.	<i>Act No. 259/2021 Coll. modifying and amending Act No. 56/2018 Coll. on conformity assessment of products, marketing of classified product and on amendment to and modification of certain acts.</i>
26.	<i>ANSI/ANS-3,5 – Nuclear Power Plant Simulators for Use in Operator Training and Examination</i>
27.	<i>Act No. 69/2018 Coll. on cyber security</i>

The complete works shall be elaborated at least in compliance with the following standards:

STN	33 3210	<i>Electrical engineering regulations. Distribution equipment. Common regulations.</i>
STN	33 3220	<i>Electrical engineering regulations. Common provisions for power stations.</i>
STN	EN 61140	<i>Protection against electrical accident. Common aspects for installation and equipment. ZM. 1-6/02.</i>
STN	33 2000–1	<i>Low Voltage Electrical Systems. Part 1: Fundamental principles, assessment of general characteristics, definitions.</i>
STN	33 2000-4-41	<i>Low voltage electrical systems. Part 4-41: Protection for safety. Protection against electric shock.</i>
STN	33 2000-4-43	<i>Electric systems of buildings. Part 4: Protection for safety. Chapter 43: Overcurrent protection.</i>
STN	33 2000-4-473	<i>Electrical engineering regulations. Electrical equipment. Part 4: Safety. Chapter 47: Use of protection measures to assure safety. Section 473: Over-current protection measures.</i>
STN	33 2000-5-51	<i>Electric systems of buildings. Part 5-51: Selection and erection of electrical equipment. Common rules</i>
STN	33 2000-5-54	<i>Low voltage electrical systems. Part 5-54: Selection and erection of electrical equipment. Earthing systems, protection wires and wires for protection connecting.</i>
STN	34 1050	<i>Electro-technical regulations STN. Regulations for laying heavy-current electric conductors.</i>
STN	EN 62305-1	<i>Lightning protection. Part 1: General principles.</i>
STN	EN 62305-2	<i>Lightning protection. Part 2: Risk management.</i>
STN	EN 62305-3	<i>Lightning protection. Part 3: Physical damage to structures and life hazard.</i>

STN	EN 62305-4	Lightning protection. Part 4: Electrical and electronic systems within structures.
STN	34 1610	Electro-technical regulations STN. Electric heavy-current wiring in factories.
STN	38 1140	Accumulator batteries and power plants and electric stations.
STN	38 1754	Rating of electrical equipment according to short-circuit current effects. ZM. a-3/84.
STN	38 1981	Protective and working aids for power stations. ZM. a-1/80.
STN	34 3100	Safety regulations for electrical equipment operation and service.
STN	33 3051	Protections of electric machines and distribution equipment.
STN	EN ISO/IEC 27002	Information technologies. Security techniques. Code of practice for information security controls (ISO/IEC 27002: 2013 including Cor. 1: 2014 and Cor. 2: 2015) (Measures to be selected pursuant to Regulation No. 362/2018 Coll.)
STN	EN ISO 9000	Quality management systems. Basics and vocabulary (ISO 9000: 2015)
STN	EN ISO 9001/01	Quality management systems. Requirements (ISO 9001: 2015)
STN	EN ISO 9004	Quality management. Quality of an organization. Guidance to achieve sustained success (ISO 9004: 2018)
STN	EN 61000-6-2	Electromagnetic compatibility. Part 6-2: Generic standards - Immunity for industrial environments
STN	33 2000-5-52	Selection and erection of electrical equipment, Electric wiring. ZM. A1-8/01
STN	EN 61140	Protection against electric shock. Common points for wiring and equipment
STN	33 3051	Protections of electric machines and distribution equipment
IEC	61226	Instrumentation and control systems related to safety - classification
ANSI/ANS	3.5-2018	Nuclear power plant simulators for operator training and testing.
IAEA-TECDOC	995	Selection, specification, design and use of various training nuclear power plant simulators
IAEA-TECDOC	685	Simulators for nuclear power plant personnel training
IAEA-TECDOC	1500	Instructions for upgrade of training nuclear power plant simulators

2.6. BACKGROUND MATERIALS OF SLOVENSKÉ ELEKTRÁRNE

Documentation for bid development

Bidders will be given this TS including all annexes. Inspections of the equipment and consultation of the background ABD documentation affected by the change will be enabled on request.

Documentation after contract conclusion

After entering into contract, the bidder will be given all necessary and available materials related to elaboration of the design documentation, selected parts of I&C ABD, electrical and mechanical parts if needed, methodical guides and company regulations affected by the change, specifying the client's requests for:

- development of design documentation
- development of draft revisions of operational documentation, technological procedures, operation instructions, guidelines,... that are affected by the design change.
- development of modifications of the affected operational documentation
- safe operation procedure
- fire protection in SE EMO
- work performance risk management
- qualification of systems and equipment for the NPP CE List
- waste management
- as-built documentation of elementary subsystems (DPS), SO and ATD for individual parts:
- available current as-built documentation of MO34 RFSS
- requirements for cyber security

3. SCOPE OF PERFORMANCE AND OPTIONS

3.1. SCOPE OF PERFORMANCE

The subject matter of the performance is to upgrade and align the current RFSS or a proposal and delivery of a new RFSS (to avoid any doubts, new means all original functionalities of the existing simulator including the requirements for modifications stated in this technical specification).

RFSS shall be a replica of the MO34 nuclear power plant Unit 3 MCR. Minor deviations of the solution are acceptable based on a proposal of the contractor; however, these deviations shall be negotiated and approved by the client before they are accepted for the solution. Their correctness and suitability for the target solution shall be justified, as well as the complete solution, by results of tests and inspections and in compliance with ANSI/ANS-3.5-2018. At the same time, the solution shall consider relevant provisions of Regulation of UJD SR No. 52/2006 Coll. on professional qualification to the relevant scope.

The simulator shall enable:

- assurance of practical training and regular retraining of main control room operators in compliance with Regulation of No. 52/2006 Coll.
- control in the full scope as from the Unit 3 MCR that is necessary for operation of the Unit at normal operation, abnormal states, emergency states including design-basis accidents, beyond design-basis accidents (accidents without serious damage of nuclear fuel)

The subject matter of performance of this TS includes also:

- *Development of a detail design documentation including ST, CT programmes that shall verify functionality and correctness of the upgraded RFSS*
- *Development and performance of RFSS acceptance tests that shall verify the full scope and representativeness of the RFSS according to the reference EMO NPP Unit 3*
- *Development of draft revisions of operational documentation for the EMO34 simulator, technological procedures, operation instructions, guidelines,... that are affected by the design change*
- *Arrangement of the works performance (delivery and installation of necessary HW and SW) in compliance with the approved detail design*
- *Performance of reference tests in the scope of the works according to the approved programmes (see the template in Annex No. 6)*
- *Presentation and defence of results of acceptance and/or reference tests before the regulatory body UJD SR*
- *Arrange familiarisation of the simulator operation and maintenance workers with the performed changes*
- *Delivery of accompanying technical documentation including detailed information about the SW configuration*
- *Delivery of DC ABD*
- *Implementation of DC ABD to ABD in the archive copy*
- *Delivery of software licenses as well as other rights and ownerships for due operation and maintenance of the deliverables (i.e. simulation software, compilation software and other licensed software both for the simulation and development software)*

The scope of delivery shall be complete including all equipment and accessories needed for safe and reliable operation, and shall contain, inter alia, goods, services and works defined in the technical specification.

The complete Technical Specification together with its annexes will be disclosed only to candidates/bidders who submit a signed "NON-DISCLOSURE AGREEMENT " in accordance with point 5.1.1 of the Tender Documents.