REPORT OF THE SLOVAK REPUBLIC



COMPILED IN TERMS OF ARTICLE 9.1 COUNCIL DIRECTIVE 2009/71/EURATOM

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Abbreviations

BN; BNS	Safety Guidelines
CDF	Core damage frequency
ECC	Emergency Control Centre
ERC	Emergency Response Centre
CMCC	Central Monitoring and Control Centre
СО	Civil protection
DEC	Design Extension Conditions
EBO	Nuclear power plants Bohunice
EMO	Nuclear power plants Mochovce
ENSREG	European Nuclear Safety Regulator Group
EURATOM	European Atomic Energy Community
EU	European Union
FCC	Fibre Concrete Container
FS KRAO	Liquid RAW Final Treatment Facility
HPP	Emergency lanning and Preparedness
HVB	Main manufacturing unit
HW	Hardware
INPO	Institute of Nuclear Power Operations
IS RAO	Interim storage of radioactive waste
IMS	Integrated Management System
ISFS	Interim spent fuel storage
JAVYS, a. s.	Joint-stock company JAVYS – Nuclear and Decommissioning company

NPP	Nuclear Power Plant				
NPP A-1	Nuclear power plant Bohunice A-1				
NPP V-1	Nuclear power plants V-1 Jaslovské Bohunice (1st and 2nd unit)				
NPP V-2	Nuclear power plants V-2 Jaslovské Bohunice (3rd and 4th unit)				
NPP EMO 1,2	Nuclear power plants Mochovce (1 st and 2 nd unit)				
NPP MO34	Nuclear power plants Mochovce (3 rd and 4 th unit)				
NI	Nuclear installation				
L&C	Limits and Conditions				
LERF	Large Early Release Frequency				
LTO	Long Term Operation				
IAEA	International Atomic Energy Agency				
MDV SR	Ministry of Transport and Construction of the Slovak Republic				
MH SR	Ministry of Economy of the Slovak Republic				
MO SR	Ministry of Defense of the Slovak Republic				
MOD	Modernization and improvement of NPP V-2				
MPSVR 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				
NIP	National Labour Inspectorate				
NRWR	National Radioactive Waste Repository				
OECD/NEA	OECD/Nuclear Energy Agency				
ОНО	Emergency Response Organization				

OSART	Operational Safety Review Team
PC	Primary Circuit
PSA	Probabilistic safety assessment
PSR	Periodic safety review
RAO	Radioactive waste
RPS JZ	Representative full scope simulator of referential Unit of NI in operation
SAMG	Severe Accident Management Guidelines
SE, a.s.	Joint-stock company Slovenské elektrárne
SHMÚ	Slovak Hydrometeorological Institute
SIRM	Safety Improvement of Mochovce NPP Project Review Mission – conclusions of IAEA mission performed at Mochovce in June 1994
SNF	Spent nuclear fuel
SO	Secondary Circuit
SPUB	System of safety performance indicators
SR	Slovak Republic
SSC	Systems, structures and components
STN	Slovak Technical Standard
TSO	Technical Support Organisations
TSÚ RAO	Technology for treatment and conditioning of radioactive waste
US NRC	United States Nuclear Regulatory Commission
ÚJD SR	Nuclear Regulatory Authority of the Slovak Republic
CSS	Central Crisis Staff
ÚRMS	Radiation Monitoring Network Centre
VUJE, a. s.	Joint-stock company Nuclear Power Plant Research Institute

- WANO World Association of Nuclear Operators
- WENRA Western European Nuclear Regulators
- ZHRS Reserve Emergency Centre
- ZZS Company Health Centre

1 Introduction

The purpose of this Report is to fulfil the obligations of the Slovak Republic under Article 9.1 of the Council Directive 2014/87/EURATOM of 8 July 2014, amending Directive 2009/71/EURATOM of 25 June 2009, establishing a Community framework for the nuclear safety of nuclear installations. Article 9.1 of the Directive imposes an obligation on the Member State to submit a report to the Commission on the implementation of the Directive by 22 July 2020. This Directive was transposed by an amendment to Act No. 541/2004 Coll. (Atomic Act) under No. 96/2017 Coll. The National Report was prepared on the basis of ENSREG Guidelines on Member States' reports as of February 2019. Chapters 4-8 of the report correspond to Articles 4-8 of Council Directive 2014/87/EURATOM, which are also listed at the beginning of each chapter.

Due to the effort to maintain the reasonable scope of the Report, it was not always possible to cite in full the specific requirements arising from acts, decrees and instructions in the Report. All these documents are available in full on the website of ÚJD SR (www.ujd.gov.sk). This report is also available on the same website.

2 Use of Nuclear Energy in the Slovak Republic

By the Resolution of the Government No. 548 of 5 November 2014, the Energy Policy of the Slovak Republic (hereinafter only as the "EP SR") has been approved. The EP SR is a strategic document that defines the main goals and priorities of the energy sector until 2035 with a forecast to 2050. The EP SR is part of the national economic strategy of the Slovak Republic (hereinafter as "SR"), as ensuring sustainable economic growth is conditioned by reliable supply of affordable energy.

The development of the energy sector focuses on optimizing energy mix in terms of energy security.

Slovakia uses and plans to use nuclear energy in its energy mix, while nuclear safety is an absolute priority. For more details, see the National Report of the Slovak Republic compiled according to the terms of the Convention on Nuclear Safety (https://www.ujd.gov.sk/ujd/WebStore.nsf/viewKey/narodna_sprava_2019/\$FILE/CNS_National% 20Report%202019_EN_final.pdf)

In terms of the approved EP SR, nuclear power plants significantly contribute to covering electricity consumption in SR. The share of nuclear energy in the total electricity production of the Slovak Republic in 2019, is shown in Fig. 1.

Back-End of Nuclear Energy Sector

Nuclear energy is the main driving force for low-carbon growth in Slovakia. In addition to safe operation, another important factor in the peaceful use of nuclear energy is managing the back-end of nuclear energy sector.



Figure 1: The share of individual sources in electricity production in Slovakia in 2019. Source: SEPS, a. s.

In accordance with the requirements of the Council Directive 2011/70/Euratom, establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste, the National Policy and National Program for the spent nuclear fuel management and radioactive waste management in SR have been developed. Government Resolution No. 387 of 8 July 2015 approved the national policy and the national program, replacing the previously valid Strategy for the back-end of the peaceful use of nuclear energy in the Slovak Republic.

3 Nuclear Installations in Slovakia

There are several nuclear installations located in the Slovak Republic as defined by Article 3 (1) of Directive 2014/87/EURATOM, in particular nuclear power plants at different stages of their lifecycle, spent fuel storage facilities and radioactive waste storage and treatment facilities located on the same site and directly related to nuclear installations.

At present, there are 4 VVER-440/V213 nuclear units in operation, 2 units in Jaslovské Bohunice and another 2 units in Mochovce. In the Mochovce site, there are also VVER-440/V213 units under construction with a significantly modernized design. In the Jaslovské Bohunice site, there are two nuclear power plants that are in the decommissioning stage, the A-1 nuclear power plant and V-1 nuclear power plant. In addition to nuclear power plants, the Interim Spent Fuel Storage Facility (ISFS), Technologies for treatment and conditioning of radioactive waste (TSÚ RAO) and the Integrated Radioactive Waste Storage Facility (IS RAO) in Jaslovské Bohunice, the Final Treatment of Liquid Radioactive Waste (FS KRAO), and the National Repository for Radioactive Waste (NRWR) in Mochovce meet the criteria of a nuclear installation. The owner and the licence holder for the operation of all operating units and units under construction in Slovakia is SE, a.s. The owner and holder of operating license for the remaining nuclear installations is JAVYS, a. s., which is also the licence holder of for the decommissioning of nuclear power plants.



Figure 2: Location of the nuclear installations in Slovakia

NI – Power Plant	Bohunice A-1 NPP	Bohunice V-1 NPP	V-2 NPP	EMO 1,2 NPP	MO34 NPP	
Site	Bohunice	Bohunice	Bohunice	Mochovce	Mochovce	
Reactor type	KS-150 / HWGCR	VVER-440/230	VVER 440/213	VVER 440/213	VVER 440/213	
Thermal reactor output, MWt	560	1375	1471	1471	1375	
Total electrical power, MWe	127/143	440	505	470	440	
Power plant condition	In decommissioning	In decommissioning	In operation	In operation	Under construction	
Date of first criticality	1972	1978-80	1984-85	1998-99	Under construction	
Last update of PSA level 1/level 2	-	-	2014/2015	2019	2016	
Last Periodic Safety Review	After 2 nd stage of decommissioning, 2016	After 1 st stage of decommissioning, 2014	2018	2019	-	
Nuclear installation	ISFS	TSÚ RAO	FS KRAO	NRWR	IS RAO	
Site	Bohunice	Bohunice	Mochovce	Mochovce	Bohunice	
Date of commissioning	1987	2000	2007	2001	2018	
Last Periodic Safety Review	2018	2019	2015	2019	-	

Basic data on all nuclear installations covered in this Report are shown in Table 1:

Table 1: Information on nuclear installations that are subject of this Report

3.1 Nuclear Power Plant A-1

Nuclear Power Plant A-1 located at the Jaslovské Bohunice site with heterogeneous reactor KS-150, was designed for electric output of 143 MW. Natural metal uranium was used as fuel, heavy water (D₂O) as moderator and carbon dioxide (CO₂) as coolant.

The A-1 NPP was connected to the power distribution network in December 1972. After the operational accident in January 1976 (1st accident), the operation was renewed, after another operational accident in February 1977, technical-economic and safety analyses were performed, and based on their results, the Government by its Resolution No. 135/79 in 1979 decided *to discontinue the operation of* A-1 NPP.

Due to the absence of legislation for the decommissioning of nuclear power plants at that time, partial problems were solved "case-by-case" and individual activities were approved. The works were focused on:

- Elimination of the consequences of an operational event,
- Preparation of fuel export to the USSR/RF,
- Development and subsequent implementation of technologies for RAW management.

The current state of A-1 NPP can be characterized as follows:

- The repatriation of spent nuclear fuel to the Russian Federation was finished in 1999 (based on Inter-Governmental Agreement from 1956);
- Medium for cooling of spent nuclear fuel: chrompik (aqueous solution of chromate and potassium dichromate K₂Cr₂O₇) is continuously vitrified, sludge of the long-term storage pool fixed into geo-polymers, dowtherm (the organic liquid mixture of diphenyl and diphenyl oxide originally coolant for fuel cells) was cleaned and incinerated or fixed in a geo-polymer matrix. For more details, see the National report of the Slovak Republic of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (https://www.ujd.gov.sk/ujd/WebStore.nsf/viewKey/NS_august2017/\$FILE/NS%20SR%20VJP%20a%20 RAO_2017_%20EN_final1.pdf).

From 1 October 2016, stage 3 and 4 of A-1 NPP decommissioning continues, permitted by ÚJD SR Decision No.369/2016. These stages are focused on the main production unit, mainly on the decommissioning of technological equipment of the primary circuit, oil management and auxiliaries to turbo-compressors, cooling systems of CO_2 , etc. The expected date of completion of stage 4 is scheduled for 31 December 2024.

Safety assessment of decommissioning activities in accordance with ÚJD SR Decree No. 58/2006 as amended, is done within the Decommissioning Stage Plan document and is subsequently updated with each change. In addition, at the end of each decommissioning stage, in accordance with ÚJD SR Decree No. 33/2012 as amended, a periodic safety assessment is performed, which is the basis for the permitting process of the next stage of decommissioning.

3.2 Nuclear Power Plant V-1

In accordance with the Resolution of the Slovak Government No. 801/1999, the operation of Unit 1 was shutdown on 31 December 2006, and Unit 2 was shutdown on 31 December 2008.

After the removal of spent nuclear fuel from the V-1 NPP to the ISFS, based on the positive opinion of the European Commission, in accordance with Article 37 of the Euratom Treaty, ÚJD SR Decision No. 400/2011 was issued for stage 1 of decommissioning.

Decommissioning of V-1 NPP is carried out in two stages.

The scope of work of the first stage of decommissioning (2011 - 2014) included dismantling of equipment and removal of structures of the secondary circuit, i. e. outside the controlled zone of the nuclear power plant, which were not necessary or suitable for further use. During this stage, the documentation necessary to obtain a permit for the 2nd stage of decommissioning of V-1 NPP was prepared. After reviewing the above documentation, ÚJD SR issued its Decision No. 900/2014 containing:

- Permit for the 2nd stage of decommissioning of the V-1 NPP nuclear installation;
- Permit for RAW management in the V-1 NPP nuclear installation;
- Permit for handling nuclear materials in the V-1 NPP nuclear installation.

This decision is effective from 1 January 2015.

The activities of stage 2 of decommissioning of V-1 NPP (2015 – 2025) are focused on dismantling of equipment and structures of the primary circuit of the NPP located in the controlled zone, i.e. the decommissioning of the nuclear island. Other unnecessary outdoor facilities at V-1 NPP will also be dismantled, such as tanks, underground piping ducts and cable lines. After the site has been restored to its original condition (or remediated) and its final inspection, the site will be released from the scope of operation of the Atomic Act. More info is available at https://www.ujd.gov.sk/ujd/WebStore.nsf/viewKey/NS_august2017/\$FILE/NS%20SR%20VJP%20 a%20RAO_2017_%20EN_final1.pdf.

3.3 Nuclear Power Plant V-2

Programmes of NPP V-2 safety improvement - historical overview

The NPP V-2 is located at the Jaslovské Bohunice site. The Programme on Modernization and Improvement of NPP V-2 (MOD V-2) safety which started in 1994 was not focused only on solving of safety issues but includes also the decision of operational issues connected with 15-years operation of NPP V-2 – physical wearing and moral obsolescence of devices, causing mainly at control systems and electric system, issues concerning the operational reliability of devices, spare parts and service. The modernization programme included also measures focused on improvement of technical-economic parameters of NPP V-2 units, first of all the primary and secondary unit output

regulation, improvement of efficiency and nominal unit output and improvement of their life of service.

Safety Concept

The basis for MOD V-2 was the measures to eliminate the deficiencies of VVER reactors stated in the IAEA report: IAEA EBP-VVER-03.

For each task of modernization of V-2 NPP, design documentation was prepared in accordance with legal framework. All tasks performed within the modernization were grouped according to related issued and according to the relation to individual technological equipment so that it was possible to assign them to individual operational sets. Within the tasks, measures were implemented to eliminate safety issues, to innovate equipment, and to improve the technical and economic parameters of units.

The V-2 NPP modernization program included more than 50 main tasks.

Second Periodic Safety Review of Bohunice V-2 NPP (PSR – 2016)

The first periodic safety review was performed in 2006. The reference date for the second periodic safety review of V-2 NPP was August 2016.

The scope of the periodic safety review corresponded with the requirements of the updated ÚJD SR Decree No. 33/2012 and ÚJD SR Safety Guide BNS I.7.4/2016 (valid as at 1 March 2019):

- 1. Design of nuclear installation;
- 2. Current state of the nuclear installation;
- 3. Equipment qualification;
- 4. Ageing management;
- 5. Deterministic safety analyses;
- 6. Probabilistic safety assessment;
- 7. Unintentional internal threats and unintentional external threats to a nuclear installation;
- 8. Operational safety of nuclear installation;
- 9. Use of experience from other nuclear installations and research results;
- 10. Organization, administration and safety culture;
- 11. Quality Management System;
- 12. Operating procedures;
- 13. Human factor;
- 14. Emergency planning;
- 15. Radiological impact on the environment;
- 16. Long-term operation.

The conclusions were elaborated in the Periodic Safety Review Report of V-2 NPP prepared by the ÚJD SR. The dates for the corrective actions take into account, first of all, their safety significance, as well as the real possibilities of their implementation.

3.4 Nuclear Power Plant Mochovce – Units 1&2

NPP EMO 1,2 is located at the Mochovce site.

Programmes of NPP EMO 1,2 safety improvement - historical overview

The construction of the NPP Mochovce started in 1981. The political and economical changes resulted in the suspension of the construction in early 90's. In 1996 a "Mochovce NPP Nuclear Safety Improvement Programme" was developed in the frame of unit 1 and 2 completion project.

The NPP Mochovce safety improvement program was based:

- on the document entitled "Safety Issues and their Ranking for NPP WWER-440/V213";
- outcomes of the safety review conducted by RISKAUDIT in 1994;
- conclusions at the IAEA Safety Improvement of Mochovce NPP Project Review Mission SIRM taking place at Mochovce in June 1994.

The *licence holder* in cooperation with VUJE, a. s. developed a set of technical specifications for 87 safety measures (TSSM) which were realized under the "NPP Mochovce Nuclear Safety Improvement Program", with taking into account specific measures as identified by the RISKAUDIT and SIRM Reports and experience with NPP V-2 and NPP Dukovany units. This has introduced certain differences between the "NPP Mochovce Safety Improvement Program" and the IAEA document "Safety Issues and their Ranking for NPP WWER-440/V213" (certain measures have been added characterized as no-category measures).

Second Periodic Safety Review Mochovce (PSR – 2018)

The first Periodic Safety Review was performed in 2008. The reference date for the second Periodic Safety Review of EMO 1,2 NPP was March 2017.

The scope of the periodic safety review corresponded with the requirements of the updated ÚJD SR Decree No. 33/2012 and ÚJD SR Safety Guide BNS I.7.4/2016 (valid as at 1 March 2019). The scope of the PSR was the same as of the PSR – 2016 of V-2 NPP (see Chapter 3.3).

The conclusions were elaborated in the Periodic Safety Review Report of V-2 NPP prepared by the ÚJD SR.

The dates take into account, first of all, their safety significance, as well as the real possibilities of their implementation.

3.5 Nuclear Power Plant Mochovce – Units 3&4

NPP MO34 is located at the Mochovce site and is under construction.

Decision on siting of Mochovce NPP

On 12 December 2016, representatives of SE, a.s., delivered **an application for permit for the commissioning of Mochovce Units 3&4 nuclear installation** to the ÚJD SR. At the same time, SE, a.s. also applied for the permit for the early use of the facility in the scope of fresh fuel storage, permit for the management of radioactive waste and spent nuclear fuel, and permit for the management of nuclear materials in a nuclear installation.

On 10 February 2020, ÚJD SR published the concerning the application of SE, a.s. for: permit for commissioning of nuclear installation in the scope of facilities and equipment needed for operation of Unit 3 of EMO, and in the scope of facilities and equipment common for Units 3&4. The parties to the proceedings could make comments no later than by 15 April 2020. Details of the proceedings are available at www.ujd.gov.sk.

3.6 Interim Spent Fuel Storage – ISFS

Description of Used Technology

ISFS located at Jaslovské Bohunice site represents a nuclear installation serving for interim spent fuel storage from WWER reactors prior to its final disposal in a repository. *It is designed as a wet storage.*

As of 31 December 2019, the storage capacity was exhausted to 90.08 % of its maximum design capacity. Due to the filling of the wet ISFS, the project "Expansion of the storage capacity for SNF in the Jaslovské Bohunice site" is underway since 2013. The planned commissioning of the additional storage capacities of SNF is in 2022.

From 2018, the second periodic nuclear safety review (PSR) has been taking place. The assessment was carried out in accordance with ÚJD SR Decree No. 33/2012 and ÚJD SR Safety Guide BNS I.7.4/2016 as of November 2018 (see also Chapter 6.1(e) IV).

As a result of PSR, integrated corrective actions with low safety significance were proposed.

3.7 Technologies for the RAW Treatment and Conditioning – TSÚ RAO, Final Treatment of Liquid RAW – FS KRAO, Integral RAW Storage – IS RAO

As part of the implementation of RAW management activities, three nuclear installations currently have licence for operation:

- Nuclear installation, Technologies for RAW Treatment and Conditioning in Jaslovské Bohunice site,
- Nuclear installation, Final Treatment of Liquid RAW in Mochovce site,
- Nuclear installation, Integral RAW Storage Facility in Jaslovské Bohunice site.

Several technologies for RAW treatment and conditioning are operated in TSÚ RAO and FS KRAO. Their detailed description can be found in the National Report of the Slovak Republic prepared in accordance with the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (www.ujd.gov.sk).

The nuclear installation "Integral RAW Storage" was built in order to ensure sufficient capacity for long-term, or interim storage of radioactive waste generated from the decommissioning of NI. This facility, which is a standalone hall-type building of a modular arrangement, was put into operation in February 2018.

3.7.1 Safety assessments

Facilities for the treatment and storage of RAW are also subject to PSR in accordance with ÚJD SR Decree No. 33/2012.

TSÚ RAO

PSR of the TSÚ RAO was performed as of the reference date of 22 January 2019. The licence holder has taken corrective actions to remediate identified deficiencies.

FS KRAO

PSR of the FS KRAO was performed as of 8 October 2015. The licence holder has taken corrective actions to remediate identified deficiencies. The next PSR of FS KRAO will be as at the reference date of 8 October 2025.

3.8 National Radioactive Waste Repository – NRWR

3.8.1 Brief description of the technology

The National Radwaste Repository (NRWR, commissioned in 2001) is a surface-type repository designed for the storage of solid and solidified low and very low active RAW from the operation and decommissioning of nuclear installations in Slovakia. The repository site is located about 2 km north-west from of the Mochovce NPP site.

The repository is built in a geological formation with low permeability and high sorption capacity. The artificial layer of compacted clay is another barrier against leakage of radioactivity. A drainage system is built, which enables the monitor of possible water leaks from each disposal box.

The repository site allows expansion to 7.5 disposal double-rows, i.e. to dispose about 27 thousand FCCs with RAW.

The details can be found in the National Report of SR prepared in accordance with the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (<u>www.ujd.gov.sk</u>).

3.8.2 PSR

The first PSR was carried out in 2009. The relevant corrective actions were implemented within the deadlines set by ÚJD SR.

Since 2019, the second Periodic Safety Review is taking place, with a reference date for assessment as of 14 September 2019. PSR has been done according to ÚJD SR Decree No. 33/2012 and ÚJD SR Safety Guide BNS I.7.4/2016.

4 Legislative, regulatory and organisational framework

Article 4

- 1. Member States shall establish and maintain a national legislative, regulatory and organisational framework ("national framework") for the nuclear safety of nuclear installations. The national framework shall provide in particular for:
 - a) the allocation of responsibilities and coordination between relevant state bodies;
 - b) national nuclear safety requirements, covering all stages of the lifecycle of nuclear installations;
 - c) a system of licensing and prohibition of operation of nuclear installations without a licence;
 - d) a system of regulatory control of nuclear safety performed by the competent regulatory authority;
 - e) effective and proportionate enforcement actions, including, where appropriate, corrective action or suspension of operation and modification or revocation of a licence.
- 2. Member States shall ensure that the national framework is maintained and improved when appropriate, taking into account operating experience, insights gained from safety analyses for operating nuclear installations, development of technology and results of safety research, when available and relevant.

4.1 National legislative, regulatory and organisational framework (Art. 4, (1))

4.1.1 An overview of the national legislative, regulatory and organisational framework for the safety of nuclear installations (Art. 4, (1))

The legal structure of regulatory activities in nuclear safety is formed by Acts, which were revised during the period of accession of Slovakia to the European Union. Some legal regulations are still valid from the period before accession (such as for example the Building Act No. 50/1976 Coll. – however, currently a new building act is under preparation).

The legal system of Slovakia can be categorized as follows:

- The supreme fundamental law of the state is the Constitution approved by the National Council of SR by qualified majority – having generally binding nature.
- 2. The acts stipulate the fundamental rights and obligations specifying the principles in various areas and are approved by the Parliament having generally binding nature.
- 3. Government ordinances are subordinated to laws and are approved by the Government having generally binding nature.
- Decrees, edicts regulations are rules issued by the central bodies of state administration (such as the ministries), to stipulate the details for implementing laws and government ordinances – having generally binding nature.

- 5. Slovak technical standards (STN), the European technical standards (STN EN) and international technical standards (STN ISO/IEC) having nature of recommendations.
- Guidelines (manuals) contain the detailed requirements and recommended steps to ensure fulfilment of requirements. These are issued by the regulatory authorities – having nature of recommendations.
- 7. Decision can be characterized as an act of law enforcement. This means that it is application of rights and obligations set in the generally binding legal regulation for a concrete case and a concrete entity. Decisions issued by administrative authorities are also called individual administrative acts and are binding solely internally for the regulator.

Acts on state regulation and allocation of responsibilities

Use of nuclear energy is governed primarily by the Act No. 541/2004 Coll. on peaceful use of nuclear energy (the Atomic Act) and on changes and amendments to certain laws as amended. The Act came into force on 1 December 2004 and repealed the original Atomic Act No. 130/1998 Coll., as well as all its implementing regulations. In the meantime, the Atomic Act has been amended *twenty-two times*.

The Atomic Act lays down the conditions for safe use of nuclear energy exclusively for peaceful purposes in compliance with the international treaties signed by the Slovak Republic. It also contains clauses setting out the *responsibilities of the competent authorities in the event of a nuclear incident.*

Act No. 54/2015 Coll. on Civil Liability for Nuclear Damage and its Financial Coverage and on amendments to certain laws addresses the consequences of a breach of nuclear safety by laying down obligations relating to the coverage of civil liability for damage incurred in causal connection with a nuclear incident.

Act No. 575/2001 Coll. on organization of governmental activities and on organization of the central state administration as amended (the "Competence Act") sets out tasks and responsibilities of central bodies of state administration. Provision concerning ÚJD SR is included under § 29 in the currently valid Competence Act.

Act No. 251/2012 Coll. on energy sector, effective from 1 September 2012, repealing the original Act No. 656/2004 Coll. on the energy sector. The Energy Act also regulates, among other things, the conditions for doing business in nuclear energy sector in the Slovak Republic, as well as the rights and obligations of natural and legal persons doing business in this field and performing state supervision and control over business in the energy sector

Act No. 250/2012 Col. on Regulation in Network Industries as amended, governs the subject, scope, conditions and method of regulation in network industries. Network industries include also power generation. Activities performed in network industries are considered to be regulated activities, for which license is required to be issued by the Regulatory Office for Network Industries.

The Act governs the terms and conditions for regulated activities and the rights and obligations of regulated entities and rules for internal market in electricity and in gas.

Act No. 24/2006 Coll. on environmental impact assessment, effective from 1 February 2006 repealed and replaced the original Act of NR SR No. 127/1994 Coll. on environmental impacts assessment. In order to ensure a high level of environmental protection, the Act regulates the process of professional and public assessment of expected environmental impacts.

The act also defines activities that are subject to cross-border environmental impacts assessment, which in the nuclear field include:

1. Nuclear Power Plants and other nuclear reactors (excluding research installations for production and conversion of fissile and enriched materials, the maximum thermal output of which does not exceed 1 kW of continuous thermal load),

2. Installations solely for the production or enrichment of nuclear fuel, for the reprocessing of spent nuclear fuel or its storage, as well as for treatment and disposal of radioactive waste.

The competent authority for assessment of environmental impacts with transboundary effects is the MŽP SR.

Act No. 308/2018 Coll. on the National Nuclear Fund and on amendments to Act No. 541/2004 Coll. on peaceful uses of nuclear energy (Atomic Act) and on amendments to certain laws as amended, which repealed the previous Act No. 238/2006 Coll. following the original Act of NC SR No. 254/1994 Coll. on the State Fund for the Liquidation of Nuclear Power Facilities and the Management of Spent Nuclear Fuel and Radioactive Waste. The Nuclear Fund is an independent legal entity, administrated by the Ministry of Economy of SR. The Fund has its own bodies (Board of Trustees, Supervisory Board, Director, Managers for sub-accounts, and the Chief Controller). Resources of the Nuclear Fund are varied – contributions from licence holders, levies collected by the operators of the transmission and distribution systems in the prices of supplied electricity directly from the end customers (intended for settlement of the so called "historical debt"), penalties imposed by ÚJD SR, interest on deposits, subsidies and contributions from the EU funds, from the state budget and other.

Act No. 87/2018 Coll. on Radiation Protection and on amendments to certain laws regulates, inter alia, the performance of state administration in the field of radiation protection, requirements for the management of radioactive substances, institutional radioactive waste and radioactive waste of unknown origin, preparedness for emergencies in exposure, monitoring of radiation situation and radiation monitoring network, obligations of natural persons and legal entities in providing radiation protection, offenses, administrative offenses and sanctions in the field of radiation protection. Details on the requirements for ensuring radiation protection for the implementation of the Act are set in the implementing decrees of the Ministry of Health of SR.

Act No. 125/2006 Coll. on Labour Inspection and on amendments to Act No. 82/2005 Coll. on illegal work and illegal employment, and on amendments to certain regulations as amended, regulates labour inspection, which promotes the protection of employees at work and the performance of state administration in the field of labour inspection, defines the competence of state administration authorities in the field of labour inspection, and their competence in exercise of supervision according to special regulation (No. *56/2018 on product conformity assessment, marketing the designate product and on amendments to certain laws)* establishes the rights and obligations of the labour inspector and the obligations of natural and legal persons.

Act No. 124/2006 Coll. on occupational health and safety establishes general principles of prevention and the basic conditions for ensuring occupational health and safety, for eliminating the risks and factors influencing the occurrence of accidents at work, occupational diseases and other health damage at work. Integral part of occupational health and safety is the safety of technical equipment. The relating generally binding legal decrees are listed in Annex 2.

With amending Act No. 50/1976 Coll. on spatial planning and building regulations (the Building Act), with the new Atomic Act effective from 1 December 2004, ÚJD SR has become a building authority for the building proceedings for constructions of nuclear installations and structures related to nuclear installation located within the premises of a nuclear installation. Before issuing a decision about siting the construction site regarding the structure, part of which is a nuclear installation, the building authority is obliged to request a binding opinion of ÚJD SR, which may bind its consent to fulfil certain conditions.

4.1.II Implementation of the national framework

Supervision over peaceful use of nuclear energy is performed by the ministries and other central bodies of state administration and organizations within their competency as stipulated by the relevant laws.



Figure 3: Structure of regulatory authorities in Slovak Republic (incomplete structure)

Nuclear Regulatory Authority of the Slovak Republic

ÚJD SR is the central body of state administration established by law (having legal personality). ÚJD SR provides for state regulation over nuclear safety of nuclear installations, including radioactive waste management and spent fuel management and other phases of fuel cycle, over nuclear materials including their control and record keeping, as well as over the physical protection of nuclear installations and nuclear materials ensured by the relevant licence holder. It reviews the intents of the use of nuclear energy and the quality of classified facilities and equipment of nuclear technology as well as the *fulfilment of obligations* of Slovakia under international agreements and treaties relating to nuclear safety of nuclear installations and nuclear materials management. *It exercises national supervision over the nuclear safety of nuclear installations so that the public and the international community are assured that nuclear safety has due priority in all aspects of the use of nuclear energy*.

Ministry of Health of the Slovak Republic

The Ministry of Health of the *Slovak Republic (hereinafter only as "MZ SR")* is the central state administration authority for health care, health protection and other activities in the field of health care. *State administration in the field of public health is performed by public health authorities established by Act No. 355/2007 Coll. on the protection, promotion and development of public health, and on amendments to certain laws. In accordance with the current scientific knowledge on the impact of physical, chemical and biological factors on public health, the Ministry is responsible for setting the limits and values of permissible load by these factors, determines the fundamental directions and priorities and monitors their compliance.*

Public Health Authority of the Slovak Republic

The Public Health Authority of the Slovak Republic (hereinafter only as "PHA SR") is a liaison point for communication with the competent authorities of other Member States in the field of radiation protection, participating in national and international programs important for radiation protection. PHA SR, in accordance with the Act No. 87/2018 Coll. on radiation protection and on amendments to certain laws, performs state supervision over the performance of activities leading to exposure, including the management of spent nuclear fuel and radioactive waste and the release of radioactive substances and radioactively contaminated objects from administrative control. It determines conditions and authorized limits in nuclear installations and at workplaces, where it has issued a permit. PHA SR performs the function of the headquarters of the radiation monitoring network and manages its activity, monitors the radiation situation, collects and processes data on monitoring results in the Slovak Republic for radiation assessment and assessments of the impact of radiation on the health of the population. PHA SR determines reference levels for optimization of exposure in an emergency situation or in an existing exposure situation, and determines the conditions for the transition from an emergency exposure situation to an existing exposure situation.

Ministry of Environment of the Slovak Republic

Ministry of Environment of the Slovak Republic (*hereinafter only as "MŽP SR"*) is responsible for development and protection of the environment including nature and landscape protection, protection of quality and quantity of waters, air protection, environmental aspects of land use planning, environmental impacts assessment, ensuring a unified information system on the environment and area monitoring.

The following bodies report to the MŽP SR:

- The Slovak Environmental Inspectorate, through which the Ministry of Environment of the Slovak Republic fulfils its function of the main body of state supervision in the matters of environment;
- Slovak Hydro-Meteorological Institute and other.

Ministry of Interior of the Slovak Republic

Ministry of Interior of the Slovak Republic (*hereinafter only as "MV SR"*) besides others, is responsible for protection of constitutional establishment, public order, security of persons and property, the integrated rescue system, civil protection and fire protection. MV SR provides for the activity of the Central Crisis Staff.

In case of an accident at a nuclear installation it is involved in management and carrying out rescue services and evacuation plans, organizes and provides for warning and notification, development, operation and maintenance of the radiation monitoring network for civil protection. It provides continuous 24 hours duty at the workplace for the performance of functions of the notification and warning centre of the Slovak Republic, the national management and coordination centre for providing and receiving international humanitarian aid, national contact point for receiving and transmitting warning messages, information reports and messages requesting help from the ERCC (Emergency Response Coordination Centre) of the European Union, the International Atomic Energy Agency in Vienna, the competent authority of the European Commission (ECURIE) in Luxembourg and other national contact points of the neighbouring countries and of the state parties, international organizations.

Ministry of Economy of the Slovak Republic

Ministry of Economy of the Slovak Republic (*hereinafter "*MH SR") is responsible for the energy sector including management with nuclear fuel, storage of radioactive waste and energy efficiency, prospecting and exploration of radioactive materials and their mining, as well as for control of exports, transports, brokering and transit of dual use items.

Ministry of Labour, Social Affairs and Family of the Slovak Republic

The Ministry of Labour, Social Affairs and Family of the Slovak Republic *(hereinafter only as "MPSVR SR")* is responsible (inter alia) for occupational health and safety, and the labour inspection. The state administration in the field of labour inspection is executed by the state

administration bodies: the MPVSR SR, the National Labour Inspectorate and regional labour inspectorates.

MPSVR SR manages and controls the National Labour Inspectorate (NIP) and is responsible for performance of labour inspection. The National Labour Inspectorate is the supervisor for labour inspectorates. The Labour Inspectorate in Nitra supervises the compliance with laws and other regulations to ensure occupational health and safety at the workplaces of nuclear installations in Slovakia (Section 7 par. 1 of the Act No. 125/2006 Coll. on labour inspection and amending and complementing the Act No. 82/2005 Coll. on illegal work and illegal employment and on amendments to certain laws as amended).

Ministry of Transport and Construction of the Slovak Republic and Department of Health Officer for the sector (ÚVHR)

Ministry of Transport and Construction of the Slovak Republic (hereinafter only as "MDV SR") is responsible for railway, road, water and air transport, electronic communication, postal services, tourism and construction. In terms of *permitting* transports of fresh a spent nuclear fuel, *MDV* SR is one of the authorities involved in *this* process. According to Section 28 par. 13 letter c) of the Atomic Act, the Ministry of Transport, Construction and Regional Development of the SR approves the emergency transport rules that contain measures during an incident or an accident in transport of radioactive material.

MDV SR is a body of *radiation protection* according to Section 4 par. 1 (d) of Act No. 87/2018 Coll. on radiation protection and on amendments to certain laws. It exercises its competencies in the field of radiation protection in railway, road, water and air transport, in accordance with Sections 8 and 9 of Act No. 87/2018 Coll. The Department of the Chief Hygienist of the Ministry (ÚVHR) of MDV SR is managed by a Chief Hygienist who is responsible for its activity, and he is appointed and recalled by the Minister of Transport. In the field of radiation protection, ÚVHR enforces the requirements of the Radiation Protection Act in the conditions of the Ministry of Transport.

ÚVHR of MDV SR exercises *state administration and* state supervision over radiation protection during transports of *nuclear and radioactive materials with national competence*.

4.1.III Identification of Differences in the Implementation of the Framework

In the Slovak Republic, nuclear energy can be used exclusively on the basis of an approval or permit issued by ÚJD SR. Given that the approval or permit, according to Section 5 par. 2 and 3 of the Atomic Act, is required for all stages of the NI's lifecycle. The implementation of the framework does not differ in terms of the type of NI that is subject to the permitting process. The definition of types of NIs is contained in Section 2 (f) of the Atomic Act. Details on general and specific requirements for nuclear safety according to the type of nuclear installation are given in particular in ÚJD SR Decree No. 430/2011. Nuclear safety requirements apply to all types of NI, by graded approach with regard to functionality or reliability, but also consequences of an accident or incident, taking into account the scope of testing and maintenance.

4.1.IV Ratification of important international conventions

Slovakia ratified the **Convention on Nuclear Safety** on February 23, 1995. ÚJD SR is responsible for fulfilment of obligations resulting from the Convention on Nuclear Safety. National Reports of the Slovak Republic, within the meaning of the Convention on Nuclear Safety, are available on the website <u>www.ujd.gov.sk</u>.

Slovakia ratified the **Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management** on January 27, 1998. ÚJD SR is responsible for fulfilment of obligations resulting from the Joint Convention. National Reports of the Slovak Republic, within the meaning of the Joint Convention, are available on the website <u>www.ujd.gov.sk</u>.

4.1.(a) The Allocation of Responsibility and Coordination between relevant state bodies (Art. 4 (1a))

Roles of regulatory bodies

Nuclear Regulatory Authority of the Slovak Republic

The competence of ÚJD SR is enshrined in Section 4 of Act No. 541/2004 Coll. on the peaceful uses of nuclear energy (Atomic Act) and on amendments to certain laws, which is very extensive (https://www.slov-lex.sk/pravne-predpisy/SK/ZZ/2004/541/20190101#paragraf-4). Pursuant to the Act No. 541/2004 Coll., ÚJD SR discharges state regulation of nuclear safety of nuclear installations.

ÚJD SR is the central state administration authority for nuclear regulation. ÚJD SR discharges state regulation in the field of nuclear safety of nuclear installations, including management of radioactive waste and spent fuel, and other phases of fuel cycle, of nuclear materials including their control and registration, as well as of physical protection of nuclear installations and nuclear materials provided by the holder of the relevant authorization. It assesses the intents of the program for use of nuclear energy and quality of safety related equipment and instruments of nuclear technology and the fulfilment of obligations of the Slovak Republic arising from international treaties concerning nuclear safety of nuclear installations and management of nuclear materials. It performs state supervision over nuclear safety of nuclear installations so that the public and the international community are assured that nuclear safety in all aspects of the use of nuclear energy is given due priority.

Public Health Authority of the Slovak Republic

The Public Health Authority of the Slovak Republic (hereinafter only as "PHA SR") is the contact point for communication with the relevant bodies of other Member States in the field of radiation protection, takes part in addressing national and international programs important for radiation protection. PHA SR performs state supervision over activities leading to exposure, including management of spent nuclear fuel and radioactive waste, and the release of radioactive substances and radioactive contaminated objects from administrative control. It specifies conditions and authorized limits in nuclear installations and workplaces, for the operation of which the permit was issued. PHA SR has the function of centre of radiation monitoring network and it manages its activity, monitors the radiation situation, collects and processes data on monitoring results in the Slovak Republic for the assessment of exposure and assessment of radiation impact on the health of population. PHA SR determines the reference levels for the optimization of exposure in an emergency or in case of continued exposure under an existing exposure situation, and determines conditions for the transition from emergency exposure situation into existing exposure situation.

The interaction between the PHA SR and ÚJD SR depends on the character of proceedings in which both authorities are involved. ÚJD SR regularly (at least once a year) hosts meeting of relevant state authorities – including PHA SR – and licence holders, where issues of common interest are discussed, e. g. licensing procedures, emergency planning actions.

Labour Inspectorate Nitra

The Ministry of Labour, Social Affairs and Family of SR manages and controls the National Labour Inspectorate (NIP) and is responsible for performance of labour inspection. The National Labour Inspectorate is the supervisor for labour inspectorates. The Labour Inspectorate in Nitra supervises the compliance with laws and other regulations to ensure occupational health and safety at the workplaces of nuclear installations in the Slovak Republic (Section 7 par. 1 of the Act No. 125/2006 Coll. I. on labour inspection and amending and complementing the Act No. 82/2005 Coll. I. on illegal work and illegal employment).

The central state administration body for cyber security in the Slovak Republic is the **National Security Authority**, which operates the SK-CERT Unit as part of its competence.

4.1.(b) National nuclear safety requirements, covering all stages of the lifecycle of nuclear installations (Art. 4 (1b)

Generally binding implementing legal regulations to the Atomic Act, which are issued by ÚJD SR in the form of Decrees, are listed in Annex 1.

ÚJD SR also issues safety guides having the nature of a recommendation (Annex 2).

Siting Legislation

Requirements and obligations for the siting of a nuclear installation and for the selection of a site are specified in the Atomic Act and in the ÚJD SR Decree No. 430/2011. ÚJD SR Decree No. 430/2011 in Annex 2 specifies the characteristics of the territory, which preclude its use for siting nuclear installations. The assessment of external risks is based on the relevant IAEA documents, which are also reflected in the safety guides issued by ÚJD SR.

International treaties relevant in terms of licensing process for NIs

Based on bilateral agreements, Slovakia is obliged thereunder to notify the neighbouring countries of planned nuclear installations and of the expected period for commissioning such nuclear installations.

As regards multilateral agreements, the Slovak Republic is party of the following conventions (e.g.):

- Convention on Environmental Impact Assessment in a Transboundary Context (Espoo Convention),
- Convention on Access to Information, Public Participation in Decision-making process and Access to Justice in Environmental matters (Aarhus Convention),
- Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (Basel),
- Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management,
- Convention on Nuclear Safety,
- Vienna Convention on Civil Liability for Nuclear Damage.

Legislation in the field of design and construction

As an implementing regulation to the Atomic Act, ÚJD SR issued its Decree No. 430/2011 specifying the details for siting, design, construction, commissioning, operation and decommissioning of nuclear installations, and for the closure of a repository. The legislation deals with the design of reactor core and the associated protection systems, possible emergency conditions, control system, protection system or principles of the primary circuit.

A nuclear installation shall be equipped with a confinement to restrict, under emergency conditions involving a leakage of radioactive substances, such leaks into the environment so as to keep them below the limit values, unless the function is provided other technical facilities.

Building structures, technological systems and components of relevance to nuclear safety of the nuclear installation shall be designed, manufactured, assembled, and tested so as to ensure their reliable function.

The construction of nuclear installations is governed by Act of the NC SR No. 50/1976 Coll. on Land Planning and Construction (Building Act) and implementing regulations thereof, the approved Framework Quality Assurance Programme for a given nuclear installation, its Stage Quality Assurance Programme for construction and the quality assurance requirements referred to in quality plans of classified equipment during their assembly and post-assembly testing.

Process of obtaining a license by a licence holder

Process of obtaining a license is specified in more details in chapter 4.1.(c).

4.1.(c) A system of licensing and prohibition of operation of nuclear installations without a license (Art. 4 (1c)

4.1.c.I. Nuclear installation licensing procedure

The licensing procedure for the nuclear installation consists of five main phases, that is: siting of the nuclear installation, its construction, commissioning, operation and decommissioning.

To obtain a license, the applicant must demonstrate its ability to comply with and fulfil all requirements of the laws and decrees of the Slovak Republic, in particular the requirements of the Atomic Act and implementing regulations to this Act. The applicant must also demonstrate that the nuclear installation is or will be operated safely.

The licensing process consists of several permits issued by various national authorities. At all stages of licensing ÚJD SR plays an irreplaceable role. If some permit is not issued directly by ÚJD SR, the applicant must submit to the issuing authority the opinion of ÚJD SR.

The whole licensing process consists of the following steps:

Spatial planning – any new nuclear installation must be approved in the national and regional land use plan and in the zoning plan, which explicitly specifies where the nuclear installation will be situated.

License to engage in the energy business – issued by MH SR and it is issued in accordance with the Energy Policy of the Slovak Republic. It is issued based on a positive opinion from ÚJD SR.

Environmental impacts assessment – the applicant must submit a statement, a decision or final position from the process of assessing impacts on the environment and human health of the given activity issued by the competent authority in accordance with the Act No. 24/2006 Coll. I. on environmental impact whose coordinator is MŽP SR.



Figure 4: Licensing process for the siting

Permission for siting – issued by the Regional Building Authority as an outcome of the land use proceedings. Before its issuance it is necessary to submit the opinion of ÚJD SR for siting a new nuclear installation. When building nuclear installations, the decision on the siting of a nuclear installation is issued by the regional building authority, which decides on the basis of a consent

issued by ÚJD SR, and opinions of other supervisory bodies (Public Health Authority of SR, labour inspection bodies).

The following licenses are issued by ÚJD SR and in order to obtain them it is necessary to submit documentation in compliance with the requirements of the Atomic Act. In all these cases it is necessary to submit the relevant Safety Report prepared at the relevant level and within the given scope.

Building permit – in case of constructing a nuclear installation ÚJD SR performs activities of a building authority and after fulfilling the requirements it issues the relevant building permit.

License for the commissioning of nuclear installation is part of the permission for early use of facility – after meeting the legislative requirements, ÚJD SR will issue the license in question. The commissioning of a nuclear installation is divided into several stages, each of which must be approved by ÚJD SR. The approval for the next stage of commissioning is issued by ÚJD SR after reviewing the report on assessment of the previous stage.

Operating license – issued based on written application and after meeting all legal requirements. The operating license is not limited in time, but the licence holder must, on the basis of the law, prove the readiness of the facility for operation by a periodic nuclear safety assessment every ten years. ÚJD SR may supplement the operating license with conditions, or order a reduction in output or shutdown of a nuclear installation.



Figure 5: Licensing procedure for construction and operation

Commissioning of the facility – begins after a positive evaluation of the trial operation.

The basic condition granting a license is the elaboration and submission of safety documentation listed in annexes of the Atomic Act necessary for issuance of particular types of decisions and meeting of legislative requirements for nuclear safety. An essential criterion is also the fulfilment of conditions of preceding approval procedures and decisions of *regulatory authorities*.

Details concerning the scope, content and method of preparing the documentation required for individual decisions, are defined in the ÚJD SR Decree No. 58/2006 Coll. as amended.

4.1.c.II. License renewal

In accordance with the Atomic Act (No. 541/2004 Coll.), Section 37bc, an operating license for operation of a nuclear installation is issued without a time limit.

4.1.c.III. Prohibition of an operation without a license

In accordance with Section 5 par. 1 to 3 of the Atomic Act (No. 541/2004 Coll.), nuclear energy can be used only based on an approval or a permit issued by ÚJD SR to a natural person or a legal entity.

Pursuant to Section 32 of the same Act, ÚJD SR may decide to limit the scope or validity of the permit or require a licence holder to take the necessary measures, or decide to stop the operation of a nuclear *installation*.

4.1.(d) System of regulatory control of nuclear safety performed by the competent regulatory authority (Art. 4; 1d)

State regulation in the field of nuclear safety - ÚJD SR

Pursuant to Atomic Act, In discharging state supervision, ÚJD SR shall:

- Perform inspections of workplaces, operations and premises of nuclear installations, operations and premises of licence holders, while checking the performance of duties under this Act, the generally binding legal regulations issued on the basis of this Act, operating procedures issued by the authorisation holder, compliance with the limits and conditions for safe operation and safe decommissioning, quality management system, as well as obligations arising from decisions, measures or regulations issued in accordance with this Act,
- Check fulfilment of commitments arising from the international treaties, by which the Slovak Republic is bound in the area covered by the scope of *this Act*,
- Check the system of professional training of employees, training programs for professionally competent employees, training programs for licensed employees of authorisation holders and checks the professional competency of employees, as well as special professional competency of employees of authorisation holders,
- In-situ investigation of the status, causes and consequences of selected failures, incidents or

accidents at a nuclear installation or events during transportation of radioactive materials; during investigation of an incident, accident or event during transportation of radioactive materials by another authority, it takes part in this investigation as an indispensable authority,

- Check conducting of the mandatory inspections, revisions, in-service inspections and tests of classified equipment relevant to nuclear safety,
- Impose removal of deficiencies influencing nuclear safety, physical protection, emergency preparedness,
- Assess nuclear safety, physical protection and emergency preparedness independently from the authorisation holder,
- Check the contents, updating and exercising the emergency plans, which it approves or reviews, and the associated trainings,
- Conduct in-situ inspections at workplaces, operations and premises of applicants for permission or authorisation and holders of permission or authorisation, including controls of compliance with the quality management systems.

Methods of supervision

Inspections

The inspections are governed by "Guideline for Inspection activity of ÚJD SR".

The inspection plan is a tool for continuous and systematic evaluation of the inspection activity at nuclear installations *and during the transport and control of nuclear materials.* As a rule it is prepared for a period of one year and it covers all areas of supervision over nuclear safety in a complex way. Inspections are carried out according to inspection procedures, which are part of the Inspection manual of ÚJD SR.

In general, the inspections are divided to **planned** and **unplanned** – as the first tier of division. In the second tier the planned and unplanned inspections are divided to routine, special and team inspections.

Inspections are conducted, as a rule, as <u>scheduled inspections</u>. Through <u>routine inspections</u>, the inspector checks to ensure compliance with the requirements and conditions of nuclear safety, the condition of NI, compliance with the approved limits and conditions, and selected operating regulations. <u>Special inspections</u> focus on specific areas, in particular on the control of compliance with the requirements and conditions of supervision pursuant to Section 31 of the Atomic Act. <u>Team inspections</u> focus on the control of compliance with the requirements and conditions of supervision pursuant to Section 31 of the Atomic Act, as a rule, simultaneously in several areas. ÚJD SR reacts to the situation (e.g. incident) at NI by <u>unplanned inspections</u>.

All types of inspections, in principle, are notified in advance to the licence holder. They may also be unannounced, if their focus and nature so require. Each inspection carried out by more than one inspector has a designated inspection team leader. Each inspection must be documented in the form of a **report** or record. The report consists of binding orders to rectify the findings, clearly formulated, comprehensible and with a clearly defined deadlines.

The statistical evaluation of findings is in the **analysis of the inspection, its purpose is** to determine the distribution and frequency of findings from inspections and modify the inspection plan if necessary to selected areas with the largest number of deficiencies. Chapter 5.3.c.II deals with inspections in more detail.

Sanction

In case of breach of nuclear safety, the regulatory body can impose penalties to the licence holder, as well as licence holder's employees. In case of non-compliance with the requirements or violation of the Atomic Act, the regulatory body is authorized to impose sanction to the holder of authorization, including financial penalty.

State regulation in the field of radiation protection - PHA SR

State regulation in nuclear installation is performed by the staff of PHA SR.

The person performing state supervision is, inter alia, authorized to enter the land, the premises, facilities and operations, and other areas of the controlled entities, request the necessary escort, take samples in the amount and to the extent necessary for the analysis, and carry out expert opinion, request the necessary information, documents, data and explanations, accompanying documents, technical and other documentation, impose measures to remedy identified deficiencies and sanctions.

The person discharging state supervision may, by a measure, for example prohibit the use of equipment and devices that immediately threaten health, order the closure of operation or part thereof, if it identifies a risk of harm to health, order a measure to reduce exposure to workers and population, order the safe removal of unused or damaged sources of ionizing radiation, radioactive waste or radioactive substances, order the development of special operating rules, working procedures and methodologies to carry out activities leading to exposure, prohibit activities or operation, order special measurements, analyses or examinations to assess harmful health factors and their impact on health. Supervision of radiation protection in activities leading to exposure and services important in terms of radiation protection is carried out a priori by assessing the proposal for performing activities leading to exposure or providing a service important in terms of radiation protection at its licensing stage and then continuously according to the nature of risk it poses.

PHA SR performs state supervision based on pre-prepared plan of reviews, which is updated once a year. During its preparation and update, the graded approach is applied, taking into account the scope and the nature of the risk involved in carrying out activities that are subject to supervision. Reviews can be also unscheduled.

System of checking compliance with the obligations and requirements to ensure radiation protection stipulated in the legislation, and compliance with the conditions and obligations set out in the permit

to conduct activity leading to exposure, is ensured primarily by a system of targeted on-site inspections, but a comprehensive system of reports, information and notifications on the situation at the nuclear installation, on exposure of workers, on emergencies and on the management of radioactive waste, which the licence holder must provide regularly in a paper or electronic form to the regulator within the deadlines set in the authorization, is also an effective tool and source of information.

On-site inspections are linked to performance of control measurements of the radiation situation and taking control samples by workers performing supervision. Reviews are mostly focused on special area important for radiation protection.

Other inspections are performed according to their timeliness (Transports of radioactive materials, Transport of spent nuclear fuel, Events, incidents and accidents, Participation in emergency exercises). Each inspection must be documented in a form of a **record**. Binding measures to remedy the deficiencies found, are part of that record. They must be clearly worded so that they impose elimination of deficiencies found, and be comprehensible with clearly defined deadlines.

State supervision in the field of labour inspection - NIP

Labour Inspectorate Nitra is authorized *to the extent provided by Act No. 125/2006 Coll.* to execute labour inspection at nuclear *installations* with a focus on checking the status of occupational health and safety, the safety status of technical equipment, the relevant documentation, accompanying technical documentation, periodical tests of classified technical equipment, and other.

Labour inspector in executing labour inspection is authorized to (i. a.):

- Enter the premises and the workplaces freely and at any time that are subject to labour inspection under the established rules provided by the relevant regulations for workplaces of nuclear installations;
- Perform inspection, test, investigation and other attendance with the aim to establish compliance with the regulations for ensuring occupational health and safety;
- Request submission of documentation, records or other documents necessary for executing labour inspection and to request copies thereof;
- To take necessary quantity of samples of materials or substances necessary for an analysis, which are in use or being handled, for the purpose of analysis etc.

Based on the result of the inspection, the labour inspector proposes technical, organizational and other measures to improve the status found, imposes measures and imposes an obligation to take measures to eliminate identified breaches of regulations and their causes, and an obligation to submit to the Labour Inspectorate Nitra information on the fulfilment of measures to eliminate identified breaches.
4.1.(e) Effective and proportionate enforcement actions, including, where appropriate, corrective actions or suspension of operation and modification or revocation of a license (Art. 4 (1e)

4.1.(e) I. Enforcement responsibilities of the regulatory authority

In accordance with the license for operation the requirements for nuclear safety, *radiation safety and occupational health and safety* and conditions of nuclear safety established or approved by ÚJD SR, are being monitored. In case of breach of act the *relevant* regulatory body can impose penalties to the licence holder, as well as licence holder's employees. In case of non-compliance with the requirements or violation of the *relevant* law, the regulatory body is authorized to impose sanction to the licence holder, including financial penalty. Detailed provisions are contained in the Atomic Act § 34. *This provision* regulates the sanction mechanism available to ÚJD SR when finding deficiencies or in the event of failure to fulfil the obligations of natural persons or legal entities in matters defined by this Act.

4.1.(e) II. Regulatory authority's power of enforcement

Section 9 of the Atomic Act stipulates that if the licence holder violates his obligations stipulated by this Act, generally binding legal obligations issued on its basis or conditions specified in the license, ÚJD SR may revoke or change the license, if the licence holder does not eliminate deficiencies found within the time limits set by the ÚJD SR.

4.1.(e) III. Framework for proportionate and effective enforcement decisions

Section 34 of the Atomic Act stipulates the amounts of fines for the licence holders for individual violations. In order to aggravating the sanctions ÚJD SR has the option to impose a fine up to a double of the possible fine to that entity, which did not respect the original sanction decision and did not remove the deficiencies. Anyone, who has not remedied the deficiencies, for which a fine has been imposed within a specified period, may get a further fine up to twice the amount of the fine that may be imposed pursuant to Section 34 of the Atomic Act.

Proceedings for an imposition of a fine may be initiated within one year from the date, when the Authority found the breach of obligation, but no later than within three years from the date, on which the breach occurred. In imposing and determining the amount of the fine, particular account shall be taken of the gravity, manner, duration and possible consequences of the breach, the cooperation and attitude of regulated entities or natural persons or legal entities concerned in remedying the consequences of the deficiencies and the measures taken. In justified cases, the Authority may waive the imposition of a fine.

By imposition of a fine to a licence holder their criminal liability remains intact, as well as the criminal liability of their employees. Revenues from the fines are an income for the National Nuclear Fund.

National Labour Inspectorate (The Labour Inspectorate in Nitra) supervises the compliance with laws and other regulations to ensure occupational health and safety at the workplaces of nuclear

installations in Slovakia (Section 7 par. 1 of the Act No. 125/2006 Coll. on labour inspection and amending and complementing the Act No. 82/2005 Coll. on illegal work and illegal employment and on amendments to certain laws as amended). Based on the result of labour inspection, the labour inspector proposes technical, organizational and other measures to improve the status found, imposes measures and imposes an obligation to take measures to eliminate identified breaches of regulations and their causes, and an obligation to submit to the Labour Inspectorate Nitra information on the fulfilment of measures to eliminate identified breaches of regulations and their causes.

The Public Health Authority of SR exercises state supervision over activities leading to exposure, including the management of spent nuclear fuel and radioactive waste, and the release of radioactive substances and radioactive contaminated objects from administrative control. PHA SR may issue instructions to eliminate the identified deficiencies.

4.2 Improvement of the National Framework (Art. 4 (2)

4.2.1. Process of developing, adopting and revising nuclear safety requirements

Legislative rules of the Government of the Slovak Republic determine the rules for creating generally binding legal regulations in a binding way and govern the procedure of the ministries and other public authorities.

The mover of the Bill (in case of the Atomic Act it is ÚJD SR) discusses it with the competent authorities and institutions in the commenting procedure. The Bill, as modified according to the outcomes of the commenting procedure, is then submitted by the mover for discussion to the Legislative Council of the Government of SR.

The section of the government legislation of the Government Office of SR prepares its position before the Bill is submitted to the Legislative Council of the Government, and that is also from the view of conformity of the law with the law of the European Union. After approval by the Legislative Council of the Government of SR the Bill is subjected to an intra-community commenting procedure within the EU according to Articles 30 to 33 of the Euratom Treaty and according to the *Directive 2015/1535 of the European Parliament and of the Council*. After this process the Bill is submitted for discussion to the Government of SR.

The Bill, which was approved by the Government is submitted to the National Council of SR as government bill.

After adopting the Bill by the National Council of SR and after it is signed by the President of SR, the Act is promulgated in the Collection of Laws of SR.

With effect from 26 May 2020, Act No. 575/2001 Coll. on the organization of government activities and the organization of the central state administration (Competence Act), which stipulates that the Government Office of the Slovak Republic provides legislative activities for other central state

administration bodies (including ÚJD SR) related to preparation and approval of constitutional laws, laws and other generally binding legal regulations.

4.2.II. Arrangements for the improvement of the national framework for nuclear safety

Since the entry into force of the Atomic Act (No. 541/2004 Coll. I.) there have been 22 amendments with the aim to take into account the experience gained in the implementation of this Act, as well as due to the development of international standards (IAEA, WENRA, etc.), operating experience of nuclear installations, and last but not least also due to the necessity to transpose the EU Directives (2006/117/Euratom, 2009/71/Euratom, 2011/70/Euratom, 2014/87/Euratom). The last amendment to the Atomic Act No. 279/2019 Coll. regulates the extension of the regime of sensitive information, as well as the method of delivery of the decision on approval or permit, invitation, notification, summons or other document during the proceedings by means of a public decree.

In accordance with the amendment to the Atomic Act, the decrees issued by ÚJD SR based on the Atomic Act, were also amended.

The recent amendments to the Decree have taken into account the WENRA Reference levels.

4.2.III. Examples of national framework improvements

The meeting of the Chairperson of ÚJD SR held on 26 October 2018 approved the document "Schedule and factual focus of work on the development of a new Atomic Act". Currently, the expert group is working on the development of a new Atomic Act. The reasons for the preparation of the new Atomic Act are mainly the implementation of measures from the Action Plan for the IRRS 2012 Mission – e.g. reduction in the number of issued decisions regarding modifications on NIs, access of the public concerned to environmental information, access to justice, practical experience in applying the law, new WENRA requirements, the E-Government Act, cyber security, tightening of personal data protection, etc. The new Atomic Act is expected to take effect from 1 January 2023.

5 Competent Regulatory Authority

Article 5

- 1. Member States shall establish and maintain a competent regulatory authority in the field of nuclear safety of nuclear installations.
- 2. Member States shall ensure the effective independence from undue influence of the competent regulatory authority in its regulatory decision-making. For this purpose, Member States shall ensure that the national framework requires that the competent regulatory authority:

a) is functionally separate from any other body or organisation concerned with the promotion or utilisation of nuclear energy, and does not seek or take instructions from any such body or organisation when carrying out its regulatory tasks;

b) takes regulatory decisions founded on robust and transparent nuclear safety-related requirements;

c) is given dedicated and appropriate budget allocations to allow for the delivery of its regulatory tasks as defined in the national framework and is responsible for the implementation of the allocated budget;

d) employs an appropriate number of staff with qualifications, experience and expertise necessary to fulfil its obligations. It may use external scientific and technical resources and expertise in support of its regulatory functions;

e) establishes procedures for the prevention and resolution of any conflicts of interest;

f) provides nuclear safety-related information without clearance from any other body or organisation, provided that this does not jeopardise other overriding interests, such as security, recognised in relevant legislation or international instruments.

3. Member States shall ensure that the competent regulatory authority is given the legal powers necessary to fulfil its obligations in connection with the national framework described in Article 4(1). For this purpose, Member States shall ensure that the national framework entrusts the competent regulatory authorities with the following main regulatory tasks, to:

a) propose, define or participate in the definition of national nuclear safety requirements;

b) require that the licence holder complies and demonstrates compliance with national nuclear safety requirements and the terms of the relevant licence;

c) verify such compliance through regulatory assessments and inspections;

d) propose or carry out effective and proportionate enforcement actions.

5.1 Competent Regulatory Authority (Art. 5 (1)

5.1.I. Regulatory authorities

The individual regulatory authorities in the Slovak Republic and their legal foundations are specified in Chapter 4.1.I and 4.1.II.

5.2 Independence of the regulatory authority (Art 5 (2)

5.2.(a) Functional separation of the regulatory authority (Art 5 (2a)

5.2.(a) I. Position of the regulatory authority

The position of the regulatory authorities in the legal system and organizational structure of the state, as well as the responsibility of the regulatory authority, are described in Chapter 4.1. Supervision over the peaceful use of nuclear energy is carried out by ministries and other central state administration bodies and organizations within the scope of their competence set out in the relevant laws according to the scheme shown in *Fig. 3*.

The Nuclear Regulatory Authority of SR was established on 1 Jan. 1993 and its powers result from the Act No. 575/2001 Coll. on the organization of activities of the government and organization of the central government. ÚJD SR is an independent state regulatory body reporting directly to the government and it is headed by the chairman appointed by the government. Independence of the Regulatory Authority from any other authority or organization dealing with development or use of nuclear energy is applied in all relevant areas.

In the field of radiation protection, state supervision is provided by the Public Health Authority of the Slovak Republic. PHA SR operates under the Ministry of Health of the Slovak Republic.

5.2.(a) II. Functional separation of the regulatory authority

Functional separation of the regulatory authority is based on legislation, namely Act No. 575/2001 Coll. and on Act No. 541/2004 Coll. ÚJD SR is not a part of and not subordinated to the Ministry of Economy of SR or any other ministry, which reflects the provisions of Sections 6 and 29 of Act No. 575/2001 Coll. Other central state administration authorities stated in Section 21 (d) to (f), (h) and (i) of the Act No. 575/2001 Coll. are headed by a chairman, who is appointed and recalled by the Government. The Chairperson of ÚJD SR reports to the government on the performance of his/her function. The Chairperson of ÚJD SR has been in her position continuously since 2002, since then six parliamentary elections have taken place. The activities of ministries through ministers and the activities of other central state administration bodies through their statutory bodies are managed, coordinated and controlled by the government.

The functional separation of the regulatory authority from the bodies responsible for the promotion or use of energy, including the production of electricity, is also underlined by the explicit ban on business activities for the top officials, which is addressed by Constitutional Act No. 357/2004 Coll. on the protection of the public interest in the performance of functions of public officials as amended. Within the principle of incompatibility of the function of a public official with another job or activity, the said regulation explicitly prevents the head of the central state administration body (Chairperson of ÚJD SR) and the Secretary General of the Service Office to perform business activity and be a statutory body or a member of a statutory body, member of management, control or supervisory body of a legal person, which was established to perform business activity, except for the general meeting and meeting of members.

5.2.(a) III. Ensuring effective independence of the regulatory decision-making

Based on Section 4 par. 1 (h) of the Atomic Act, the Authority shall present to the Government of Slovakia and subsequently to the National Council of the Slovak Republic once a year, always as at 30 April, a report on the status of nuclear safety of nuclear installations in Slovakia and on its activities for the past year.

The financial independence of the supervisory body is ensured through Act No. 523/2004 Coll. on Budgetary Rules of Public Administration and on amendments to certain laws as amended. ÚJD SR has a separate budget, which is connected by its revenues and expenditures to the state budget of the Slovak Republic.

Independence in the decision-making of ÚJD SR is underlined by the fact that in the second instance administrative proceedings, the chairperson of ÚJD SR decides without the need for the consent of any other body or organisation. The administrative procedure (appealing) is subject to the possibility of reviewing the decision in the regime of the administrative judiciary.

A more detailed definition of the scope of powers, tasks, principles of activity and internal organization of ÚJD SR and its relations with ministries and other central state administration bodies and other bodies and organizations is laid down in the Statute of ÚJD SR.

5.2.(b) Regulatory decision-making (Art 5 (2b)

5.2.(b) I. Process for regulatory decision-making

The key legislation in the field of nuclear safety is the Atomic Act. On the basis of this Act, ÚJD SR prepares and issues *legally binding* decrees and decisions.

In general, a regulatory decision can be characterized as an individual act of law enforcement. This means that it is application of rights and obligations set in the generally binding legal regulation for a concrete case and a concrete entity. Decisions issued by administrative authorities are also called individual administrative acts. Obligations imposed by a decision are enforceable and defaulting on them is punishable. As a principle the decisions are subject to the possibility of filing an action in court for judicial review of decisions.

ÚJD SR issues various types of decisions: decision on the issue of authorization, decision on issue of license, on approval, on imposing sanction or measure, on designation of a new licence holder, on verification of competence, on documentation review, and other.

In the process of issuing decisions under the Atomic Act and Act No. 50/1976 Coll. ÚJD SR publishes the documentation supporting the decisions on its website, and gives the parties to the proceedings and the public the opportunity to make comments on them.

5.2.(b) II. Nuclear safety-related requirements that are the basis of the decision-making

Nuclear safety-related requirements that are the basis for the decision-making of the regulatory body, are specified in Chapter 4.1(b).

5.2.(b) III. Policy for transparency of safety-related requirements

Nuclear regulator is led by the principles of transparency through several legislative acts, including **Act No. 400/2015 Coll.** on the development of legal regulations and on the Collection of Laws of the Slovak Republic and on amendments to certain laws, **Act No. 305/2013 Coll.** on the electronic form of exercise of powers by public authorities, (E-Government Act), **Act No. 162/2015 Coll.** (Administrative Court Rules) and **Act No. 24/2006 Coll.** on environmental impact assessment. Pursuant to the above-mentioned acts, public participation in the process of drafting legal regulations is guaranteed through the possibility of submitting comments in the comment procedure, which takes place in the electronic system of public administration for the creation of legal regulations (Slov-Lex Portal).

In this decisions, UJD SR ensures the policy of transparency mainly by providing opportunities for making comments, proposals for amendments, raising public objections when issuing decisions under the Atomic Act for all stages of the lifecycle of nuclear installations. As part of its transparency, all decisions are. amona other thinas. published on the ÚJD SR website (https://www.ujd.gov.sk/amis/dbrozhod.nsf/formRozhodnutie2020)

5.2.(b) IV. Examples of transparency of nuclear safety requirements

All decisions are published on the ÚJD SR website.

External communication of ÚJD SR directed to the public, state and public administration bodies, as well as to the international community is also provided through the annual Report on the State of Nuclear Safety of Nuclear Installations in the Slovak Republic in two language versions (SK, EN).

5.2.(c) Financing of the regulatory body (Art 5 (2c)

5.2.(c) I. Ensuring financial needs of the regulatory body

According to the Statute of ÚJD SR, Article 2, ÚJD SR as a budgetary organization is connected to the state budget with its revenues and expenditures. The management of budget funds, which by law is approved by the National Council of the Slovak Republic, is controlled by the Supreme Audit Office. ÚJD SR is a legal entity, the rules of management of the state budget organization apply to the management of its funds and it has its separate chapter in the state budget.

In this connection it is necessary to state that from 1 January 2008 annual contributions have been introduced into the legal order of SR for execution of state regulation in nuclear safety. The Act No.94/2007 Coll. amending the Atomic Act, imposes an obligation to the licence holders to pay annual contributions for execution of state regulation in nuclear safety. The basic principle of the adopted law is securing sufficient funding for regulatory activities relating to nuclear safety, for maintaining the expertise of its staff and for their stabilization, for safety research and it aims at reducing demand on the state budget by raising other external sources. The Act stipulates rules for determining the amount of annual contribution and the method of calculating the contribution. The



amount of annual contribution depends on the type of nuclear installation and the type of issued license.

5.2.(d) Staffing of the Regulatory Authority (Art 5 (2d)

5.2.(d) I. Meeting the staffing needs and expertise of the regulatory authority

Pursuant to Section 4 par. 4 of the Atomic Act, in the exercise of powers pursuant to paragraphs 1 to 3, ÚJD SR uses human resources and financial resources necessary for the fulfilment of obligations under this Act in accordance with the resource possibilities of the state budget. It may use external scientific and technical resources and expertise to support its regulatory functions.

The upward trend in the number of employees in relation to the growing volume of regulator's functions can be observed in the annual reports published on the ÚJD SR website (https://www.ujd.gov.sk/ujd/www1.nsf/viewByKeyMenu/Sk-xx-06-02-VS

https://www.ujd.gov.sk/ujd/www1.nsf/viewByKeyMenu/En-xx-06-02-VS).

For 2020, ÚJD SR has a budgeted total number of 128 employees, of that 111 civil service positions and 17 employees for work in public interest.

ÚJD SR annually approves and evaluates the annual plan of continuous education and training of all employees. ÚJD SR considers continuous training to be a systematic process of providing and acquiring knowledge, maintaining, improving and complementing skills, abilities, habits and experience that an employee needs to perform work activities. This process distinguishes between adaptation training and competency training. Adaptation training is designed to ensure that a new employee is quickly adapted to his/her current job position. Competency training includes vocational

Figure 6: Composition of the budget chapter of ÚJD SR. Source: ÚJD SR.

training, language training, management training, personal development training, as well as IT training. Particular attention is paid to competence training of ÚJD SR inspectors, in the form of modules focused on professional areas related to the operation of nuclear installations and activities in the field of nuclear energy use.

ÚJD SR uses also modern forms of education, such as self-study or e-learning forms of training/retraining.

Currently, ÚJD SR is running a project "Implementation of Knowledge Management", to ensure that the regulator's staff pass-on knowledge between experienced and less-experienced staff, but also to maintain critical knowledge within the regulatory authority.

The CAF system (Common Assessment Framework) is also used to assess and improve the activities of the ÚJD SR. Activities relating to the management system are managed by the Board for the management system headed by the chairperson of the ÚJD SR. The Board develops concept for further development of the management system including building the safety culture at the ÚJD SR. In doing this it takes into account experiences from implementing management systems in the state administration and international safety standards in the field of management of regulatory bodies for nuclear safety.

5.2.(d) II. Non-in-house technical expertise

Technical Support Organisations (TSO)

One of the main pillars of safe use of nuclear energy is also services by the technical support organizations (TSO), universities and the Slovak Academy of Sciences (SAV) providing broad spectrum of necessary technical skills, which the operator or the regulator are unable to secure with their own capacity.

TSO works partially for licence holders and partially for the regulator in those areas, where it is assured that there is no conflict of interest.

The activities of these TSOs focus on the area of nuclear safety including radioactive waste and decommissioning of nuclear installations in a form of various analyses, technical reports, opinions, etc.

These organisations participate mainly on activities focusing on:

- Proposals of systems linked with design, construction, operation and reconstruction of nuclear installations;
- Development of supporting analyses focusing on, e.g. modernization of control and management system for NPP of VVER-440/V213 type, unit uprating, probabilistic analyses, etc.;
- Services in the field of computational modelling of design basis and beyond design basis accidents (including severe accidents with core meltdown) of nuclear power plants;

- Elaboration of accident analyses for Safety Reports;
- Independent review of emergency analyses for the safety reports of NPP V-2 and Mochovce 1,2;
- Consultancy in the area of safety of nuclear power plants (fire protection, improving wiring, seismic and other external events);
- Elaboration of basic technical and EIA documentation;
- Preparation of safety reports, etc.

Professional training of staff of the licence holders, as well as for the third parties (the third parties are contractor organizations) is carried out in compliance with the documentation *Integrated Management System*, developed and maintained in accordance with:

- Generally binding legal regulations;
- The IAEA, WANO, INPO standards and guides;
- Slovak technical standards STN EN ISO 9001:2016 a STN EN ISO 14001,
- STN EN ISO 9001:2001 and 14001:2004 standards;
- Documentation of the integrated management system.

Management documentation for human resources, including training and development of staff and the management, sets out procedures and responsibilities, *inter alia*, for obtaining and maintaining the general competence of contractors' staff.

5.2.(e) Prevention of conflicts of interest (Art. 5 (2e)

5.2.(e) I. Conflict of interest in the case of rotation of staff between industry and regulators

The key obligations arising for a civil servant from Act No. 55/2017 Coll. on Civil Service is to perform the civil service in a politically neutral and impartial manner, and to refrain from performing any civil service that could jeopardize confidence in the impartiality of the civil service and confidence in the objectivity of its conduct and decision-making, and to refrain from conduct, which could lead to conflict of interest and personal interests. In particular not to misuse information obtained in connection with the provision of civil service for his/her own benefit or for the benefit of another person. Furthermore, a civil servant is obliged to notify the Service Office without undue delay of any actual or potential conflict of interest, as well as of teaching or lecturing activities that is identical or similar to the activity specified in the description of his civil servant from conducting business and performing any other gainful activity, which is identical or similar to the activity service position.

A civil servant shall not be a member of the management bodies or supervisory bodies of legal entities conducting business activity, except for the general meeting and the meeting of members,

with the exception of such bodies, to which he/she has been seconded by the Government or by the Service Office.

Constitutional Act No. 357/2004 Coll. further addresses the limitation on the rotation of the executive staff between the nuclear industry and the regulator. These provisions, applicable to Chairperson and Secretary General of ÚJD SR, are specified in Sec. 8, par. (1) of the Act.

The principles of ethical behaviour of a civil servant in connection with the performance of civil service are regulated by the Decree of the Government Office of SR No. 400/2019, which issues the The Code of Ethics for Civil Servants. The basic principles are political neutrality, impartiality, the public interest, dignity, respect for interpersonal relations and professionalism. The obligation to prevent conflicts of interest arises for ÚJD SR among other things also from internal regulations, Quality Manual, which imposes strict personal and professional ethical principles on its employees supervising nuclear safety of NIs.

ÚJD SR as a service office has several options that can prevent conflict of interest in the present case, especially by reassigning the employee to another position, within which there will be no conflict of interest, exclusion of civil servants from decision-making, prevention of access to information, or through conducting an enquiry into a conflict of interest by an authorized person.

5.2.(e) II. Conflicts of interest in case of TSOs

Selection of the technical support service provider is generally governed by Act No. 343/2015 Coll. on public procurement (hereinafter only as "Act No. 343/2015 Coll."), which deals with conflict of interest and to that end, imposes obligations on contracting authorities so as to avoid conflicts of interest, which could disturb or restrict competition, possibly breach the principles of transparency and equal treatment. For the purposes of this Act, a conflict of interest is, in particular, a situation in which an involved person, who may influence the outcome or conduct of a public procurement, has a direct or indirect financial, economic or other personal interest, which could be considered as a threat to his impartiality and independence in relation to public procurement.

One of the key competencies of ÚJD SR is independent evaluation and analytical activities. ÚJD SR has its own technical-analytical capacities to support the decision-making process and has its own specialized team of experts dealing with safety analyses and tools for safety assessment. In certain specific cases, when ÚJD SR does not have the required expertise, it uses technical support from various organizations such as research institutes, academic organizations operating in Slovakia, but also abroad. ÚJD SR's internal directive on public procurement requires possible conflicts of interest to be taken into account when obtaining external technical support. However, the use of external technical assistance and advice does not release ÚJD SR from liability in the performance of regulatory activities and in issuing decisions towards licence holders.

5.2.(f) Provision of nuclear safety-related information (Art. 5 (2f)

5.2.f.I. Information provision arrangements

Atomic Act in Section 4, par. (1) h), i), stipulates the obligation of ÚJD SR to submit a report on the state of nuclear safety of NIs in the Slovak Republic, and on its activities for the past year (see Chapter 5.2.(a) III).

Inform the public on

- 1. incidents and accidents at nuclear installations in Slovakia,
- 2. accidents outside Slovakia,
- 3. material deficiencies found by the Authority at nuclear installations and on measures adopted to remove them,
- 4. events during transport of radioactive materials except classified information that are subject to protection according to special regulation,
- 5. other facts relating to nuclear safety of nuclear installations in Slovakia including the management of radioactive waste and spent fuel.

5.3 Legal powers of the regulatory authority (Art. 5 (3)

5.3.(a) Power to propose, define or participate in the definition of national nuclear safety requirements (Art. 5 (3a)

These requirements are given in Chapter 4.2.I.

5.3.(b) Power to require the licence holder to comply and demonstrate compliance with national nuclear safety requirements (Art. 5 (3b)

The regulatory authority has the power to control compliance with national requirements for nuclear safety through inspections pursuant to Sections 31 to 34 of the Atomic Act.

Provisions of Section 10 of the Atomic Act specify the obligations, which the holder of license issued by ÚJD SR is required to meet under this Act. The obligations are designed to constantly monitor the nuclear safety of nuclear installations in operation to fulfil the conditions and the documentation, which was reviewed or approved by ÚJD SR, to maintain competence levels of the staff, as well as to approach to application of modifications on the NIs in operation.

It specifies the basic obligations of the licence holder, which can be divided into several groups. The first group includes the obligations towards ensuring nuclear safety, emergency preparedness, etc., that are most in the public interest in order not to endanger the lives and health of the public or the quality of the environment. Another group are obligations of an administrative nature towards ÚJD SR, such as compliance with the approved documentation, providing access to the premises and provision of cooperation, establishes an obligation to update the validity of license by application for issuing an operating licence, or licence for the decommissioning phase, because at some point of the life cycle of a nuclear installation it is not acceptable that there would be no entity

in Slovakia, which would continue in activities without a license, in particular with regard to the actual number of licence holders of this type on the market in the Slovak Republic. The third very important group of obligations are different types of information obligations both towards the public and the ÚJD SR and towards the European Commission, or its competent authorities. Failure to comply with the obligations under Section 10 is a prerequisite for exercising accountability against the licence holder.

5.3.(c) Power to verify such compliance through regulatory assessments and inspections (Art. 5 (3c)

5.3.(c) I. Legal arrangements of the regulatory authority

The individual legal arrangements of the regulatory authority to verify compliance with the obligations for the performance of state supervision are contained in Section 4 par. 3 of the Atomic Act. These measures are specified in Chapter 4.1.(d).

5.3.(c) II. Examples of implementation of compliance with regulatory requirements through inspections

Nuclear installation	Scheduled			Unnlonnod	Total	
Nuclear installation	Routine	Special	Team	Unplanned	Total	
JAVYS (V-1)	4	8	2	2	16	
SE – EBO (V-2)	4	16	13	5	38	
SE – EMO 1,2	5	18	13	2	38	
SE – MO34	4	6	2	15	27	
JAVYS – VYZ	5	15	3	0	23	
VUJE	0	2	0	0	2	
Transports of NM and RAW	0	5	0	8	13	
Control and registration of NM	0	27	0	15	42	
Other inspections	0	4	0	1	5	
Total	22	101	33	48	204	

A detailed breakdown of inspections of ÚJD SR for 2019 is shown in Table 2.

Table 2: Preliminary statistics of inspections at nuclear installations in 2019.

Inspection topics:

- Decommissioning, RAW management
- Permits for special air operations (within the scope of Physical protection) airspace zone LZ P1, test of compliance with the directive on operation of drones
- Training and qualification of staff
- Physical protection
- Coordination of emergency response in the whole premises for emergency drills

- Operation and fire safety
- Periodic tests to verify the operability of safety systems
- Fresh fuel/spent fuel storage
- Checking documentation changes
- Emergency planning inspection of performance of monitoring systems
- Technical specifications/Limits and conditions for operation: record
- Inspection after refuelling
- Maintenance, testing, calibration and revision of I&C qualified equipment
- Fulfilment of the Action Plan for LTO
- On-line transfer of technological, radiation and meteorological data
- Increasing resistance against earthquake
- PSA study
- Containment tightness test, regular rehearsal
- Inspection of processes of elaboration, evaluation, approval, verification and validation, updating and maintenance of regulations for dealing with emergencies (NS)
- Control of the QA system
- Coordination of emergency response in the whole area of emergency exercise
- Readiness for commissioning
- Safety Culture
- Integrated management system
- Cyber security
- RAW transport
- Storage of SNF
- Fresh fuel transports
- Nuclear materials

Safety significance of inspection findings:

- Category 1: The findings may have or have little impact on nuclear safety or have an indirect impact on nuclear safety. The findings do not jeopardize defence in-depth barriers.
- Category 2: The findings may have or have a moderate impact on nuclear safety or recurrence of Category 1. The findings do not threaten defence in-depth barriers, but the barrier has been compromised.

• Category 3: Findings with a high impact on nuclear safety or recurrence of Category 2. The occurrence of these findings led to damage of one of the defence in-depth barriers. The vigilance level of the licence holder is low.



Figure 7: Number of ÚJD SR inspection in 2005-2019. Source: ÚJD SR.

5.3.(d) The power to propose or carry out effective and proportionate enforcement actions (Art. 5; 3d)

These provisions are specified in more detail in Chapter 4.1.(e).

6 Licence holders

Article 6

Member States shall ensure that the national framework requires that:

- a) the prime responsibility for the nuclear safety of a nuclear installation rests with the licence holder. That responsibility cannot be delegated and includes responsibility for the activities of contractors and sub-contractors whose activities might affect the nuclear safety of a nuclear installation;
- b) when applying for a licence, the applicant is required to submit a demonstration of nuclear safety.
 Its scope and level of detail shall be commensurate with the potential magnitude and nature of the hazard relevant for the nuclear installation and its site;
- c) licence holders are to regularly assess, verify, and continuously improve, as far as reasonably practicable, the nuclear safety of their nuclear installations in a systematic and verifiable manner. That shall include verification that measures are in place for the prevention of accidents and mitigation of the consequences of accidents, including the verification of the application of defence-in-depth provisions;
- d) licence holders establish and implement management systems which give due priority to nuclear safety;
- e) licence holders provide for appropriate on-site emergency procedures and arrangements, including severe accident management guidelines or equivalent arrangements, for responding effectively to accidents in order to prevent or mitigate their consequences. Those shall in particular:
 - *i.* be consistent with other operational procedures and periodically exercised to verify their practicability;
 - *ii.* address accidents and severe accidents that could occur in all operational modes and those that simultaneously involve or affect several units;
 - iii. provide arrangements to receive external assistance;
 - *iv.* be periodically reviewed and regularly updated, taking account of experience from exercises and lessons learned from accidents;
- f) licence holders provide for and maintain financial and human resources with appropriate qualifications and competences, necessary to fulfil their obligations with respect to the nuclear safety of a nuclear installation. Licence holders shall also ensure that contractors and subcontractors under their responsibility and whose activities might affect the nuclear safety of a nuclear installation have the necessary human resources with appropriate qualifications and competences to fulfil their obligations.

6.1.(a) Primary responsibility for nuclear safety (Art. 6 (1a)

6.1.(a) I. The concept of nuclear and radiation safety

Nuclear safety according to Act No. 541/2004 Coll. (Atomic Act) shall mean the technical status and the capability of the nuclear installation on transport equipment, as well as their operating personnel to prevent unauthorized release of radioactive substances or ionizing radiation to the working environment or the environment and ability to prevent events and to mitigate consequences of events at nuclear installations or during transport of radioactive materials.

Radiation protection, in accordance with the provisions of Act No. 87/2018 Coll. on radiation protection, is defined as a system of technical measures or organizational measures to limit the exposure of individuals from the effects of ionizing radiation.

Nuclear energy may only be used for peaceful purposes and in line with national strategies, international treaties and in accordance with the national legal framework and legal acts of the European Union. The use of nuclear energy for other than peaceful purposes is prohibited.

The use of nuclear energy shall be justified by benefits outweighing potential risk of such activities, in particular when compared with other ways, which accomplish the same purpose.

In the use of nuclear energy, priority must be given to safety aspects over all other aspects.

When obtaining new significant information about the risks and consequences of using nuclear energy, the given level should be reconsidered and necessary measures must be taken.

The purpose of safety policy of licence holder's is to set safety goals, requirements, fundamentals, principles, responsibilities, measures and methods of their implementation for all safety areas, such as the nuclear safety and radiation protection, environmental safety, operational safety, security, physical safety, occupational health and safety and protection against fires, safety of integrated information system and telecommunication network, protection of classified information, emergency planning and civil protection, personal safety, administrative safety, financial safety, protection of goodwill and planning continuity of activities.

The safety policy is pursued through internal management acts, as well as through checking compliance with these at all levels of company management.

The observance and fulfilment of safety policy content by all employees belongs to main priorities and objectives; safety is an integral part of all activities.

To achieve safety goals the main safety requirements and principles of nuclear safety and radiation protection are set:

- Nuclear safety and radiation protection is a priority and it is superior over any other interests of the company.
- Every employee is responsible for nuclear safety and radiation protection within the scope of his / her competencies, responsibilities and functional responsibilities.

- For all activities related to nuclear installations, the principles of safety culture and nuclear security culture are applied.
- Principles of defence in-depth strategy, i.e. multi-level, mutually over lapping measures aimed at prevention, in particular, but also at mitigation of accidents apply in the design of nuclear installations and activities relating to operation of nuclear installations.
- Systems and components having relevance from the safety aspect are tested on a regular basis, with the aim to verify their functionality and operability.
- Safety audits of individual safety systems are carried out periodically.
- The Quality Management System is built in accordance with the legal framework, the IAEA Safety Standards and of the Slovak Technical Standard STN EN ISO 9001.
- The latest knowledge and experience from operation of nuclear installations within the country and abroad are being utilized on a permanent basis.
- A national assessment is carried out with a specific thematic focus on nuclear safety of nuclear installations (this assessment was first conducted on the topic of ageing, in 2017).
- International assessments and reviews are utilized on a regular basis to get an independent assessment of the nuclear safety and radiation protection levels.
- An open dialogue with the public, the local and regional bodies of state administration and self-government is applied.
- Safety risks relating to nuclear safety and radiation protection occurring at present are being identified, analysed, classified and managed across all levels of management. More serious risks are submitted to the Nuclear Safety Committee being the advisory body to the top management of the Operator.
- The operators are spending adequate material and financial resources to achieve the safety goals and fulfil the safety requirements, rules and principles of nuclear safety and radiation protection, improve education and qualification of employees.

The primary responsibility for nuclear safety and radiation protection rests with the licence holders.

6.1.(a) II. Practical implementation in relation to the activities of contractors and subcontractors

The Integrated Management System (IMS) is the cornerstone for determining the IMS policy and objectives of the company and the method of their fulfilment in an efficient and effective manner. At the same time, it ensures the fulfilment of all relevant requirements of stakeholders, such as, for example, customers, owners, the public, suppliers, but also its own employees.

The licence holder must also ensure that contractors and sub-contractors, whose activities could affect nuclear safety of nuclear installation, have the necessary human resources with the appropriate qualifications and competence to perform those activities.

Quality Management System Audits at Suppliers

The purpose of these audits is to ensure quality and reliable contractors.

Licence holders carry out audits of quality management systems of selected suppliers affecting nuclear safety of nuclear installations, at which they check the effectiveness of application of requirements for their management systems according relevant ISO standards and specific nuclear requirements arising from national legal norms and the IAEA safety standards. Requirements posed on the suppliers are transferred through contracts, including general terms and conditions, technical and safety requirements for performance, which are attached to the contracts.

If the licence holder finds deficiencies, the procedure depends on the requirements in the applicable contracts with the given contractor, and the results of previous audits. The IMS procedures stipulate that the audit must be carried out before the contract is signed (in time pressure, in exceptional cases, the audit must be carried out within 30 days of the contract conclusion).

The validity of audit is max. 3 years (2 years for contractors of MO34 completion project). After 3 years, subsequent audit of the contractor is performed only if the contractor has been included in the annual plan again, or if the contract with the contractor still exists.

If certain deficiencies are found during the audit, the contractor is obliged to take corrective / preventive actions. Their fulfilment is checked during the follow-up audit (after 1 year or 3 years).

The information is stored in the database of audited / potential contractors of SE (in case of deficiencies in evaluation "included in the comments or conditionally included" depending on the severity of deficiencies) and the result is also provided to the procurement department and included in the Vendor assessment system.

6.1.(b) Demonstration of nuclear safety (Art. 6 (1b)

6.1.(b) I. Regulatory requirements for safety assessment; legislation in the field of siting, design and construction

ÚJD SR Decree No. 430/2011 Coll. on the requirements for nuclear safety, specifying the details for siting, design, construction, commissioning, operation and decommissioning of nuclear installations, and in closing a repository.

When siting NI, an assessment of the geological and seismic load of the selected site must be elaborated and Annex 2 to the ÚJD SR Decree 430/2011 defines the characteristics of the area that preclude its use for siting a nuclear installation.

Annex 3 to the Decree defines general requirements for the design of a NI:

- Basic Nuclear Safety Requirements,
- Safety Functions and Safety Characteristics
- Defence-in-depth,
- Operational Experience
- Research Results in the field of nuclear safety,
- Design-basis Accidents,
- Radiation Protection,

- Ventilation Systems and Filtration Systems, etc.

Requirements for construction, commissioning, operation, decommissioning and in the case of a repository, during closure, are defined in Annex 4 of the ÚJD SR Decree No. 430/2011. The requirements are divided into general requirements, special requirements for NIs with nuclear reactor and special requirements for other NIs.

As regards NPPs, the design of the reactor core and related protection systems shall ensure that limit parameters of fuel assemblies during normal and abnormal operation are not be exceeded. In case of emergency conditions, the limit failure of the fuel assemblies shall not be exceeded; it is necessary to ensure that limit parameters of fuel assemblies, which serve as the basis for design of other equipment, are not exceeded during normal operation, abnormal operation and design accidents.

Control systems shall be equipped so as to monitor, measure, register, and manage systems of relevance to nuclear safety.

Protection systems shall be capable of automatically starting up reactor protection systems, with operating personnel having the possibility of starting up these systems manually. Protection systems shall be backed up and allow for functionality testing.

The primary circuit design principles require that sufficient strength be provided under normal and abnormal operation so as to prevent a loss of coolant and allow throughout the whole operation for periodic or continuous monitoring for the primary circuit condition and testing necessary to verify the nuclear safety.

A nuclear installation shall be equipped with a confinement to restrict, under emergency conditions involving a leakage of radioactive substances, such leaks into the environment so as to keep them below the limit values, unless the function is provided other technical facilities.

Building structures, technological systems and components of relevance to nuclear safety of the nuclear installation shall be designed, manufactured, assembled, and tested so as to ensure their reliable function. The investor (the holder of an license to construct a nuclear installation under Art. 5 (3) of the Atomic Act) shall ensure that the manufacturers and suppliers of classified equipment (equipment of relevance to nuclear safety), materials and accessories thereof are obliged to set out in the supply quality documentation the results of selected quality checks and tests of properties of components, equipment, base material, welded joints and weld deposits, material properties and composition as well as indications and removed material defects detected by an inspection.

Control systems shall allow for monitoring of systems and measurement, registration, and management of values. Devices and actuators shall be designed and arranged so that maintenance personnel constantly have sufficient information on operation of the nuclear installation (ÚJD SR Decree No. 430/2011 Coll.). The control room shall allow for safe and reliable operation control. *The Emergency Control Room is designed to bring the reactor into a sub-critical state and to cool down the Unit in case these operations cannot be performed from the Unit Control Room (BD)*

due to the impossibility of BD operators to stay in this area while meeting the conditions of nuclear safety.

The construction of nuclear installations is governed by Act No. 50/1976 Coll. on Land Planning and Construction (Building Act) and implementing regulations thereof.

The basic document, according to which safety is being assessed, is the Preliminary Safety Report containing the description of the power plant to the extent that is sufficient for an independent evaluation of the safety features. The review of the safety report by ÚJD SR forms the foundation for issuance of license for construction and operation and proves that all safety-related issues has been sufficiently addressed.

All nuclear power plants have safety reports (the so-called Pre-operational Safety Report "POSAR"), which are updated and are reviewed by the regulator. In accordance with the applicable national legislation, the update of safety report is continuous process.

6.1.(b) II. Graded assessment of nuclear safety of NPPs

Part of the requirements for the quality of safety-related equipment is their categorization into safety classes. Pursuant to Section 3 par. 1 of the ÚJD SR Decree No. 430/2011 and SE, a.s. internal documents on the quality, a graded approach is applied to the categorization of safety-related equipment: "Safety-related equipment must be identified and then categorized according to its function and importance for nuclear safety into safety classes from I to IV. Classification of safety-related equipment with the highest requirements for reliability, qualification, quality assurance, number and scope of inspections and related documentation. Safety-related equipment must be designed, with their classification."

6.1.(c) Nuclear safety assessment of nuclear installations by licence holders (Art. 6 (1c)

6.1.(c) I. Requirements for safety assessments imposed by the regulatory authority for the licence holder and demonstration of continuous improvements in nuclear safety

Pursuant to Section 23 par. 2 (f) of the Atomic Act, during operation and during decommissioning of a nuclear installation, the licence holder is obliged to regularly assess, verify, and as far as reasonably practicable, continuously, systematically and in a verifiable manner, enhance nuclear safety of nuclear installations at least every ten years, taking into account the current knowledge in the field of nuclear safety, take measures to eliminate the identified deficiencies and to eliminate their recurrence in the future; this also includes verifying that measures are in place to prevent accidents and mitigate the consequences of any accidents, including verification that the defence-in-depth principles are applied.

Requirements for periodical, comprehensive and systematic nuclear safety review are defined by ÚJD SR Decree No. 33/2012. The Decree specifies the intervals and scope of the periodic review during operation and during decommissioning.

ÚJD SR Safety Guide BNS I.7.4 / 2016 on comprehensive periodic nuclear safety review specifies and supplements the general requirements and conditions for comprehensive periodic safety review.

6.1.(c) II. Requirements of the regulatory authority to verify implementation of safety measures

Safety assessment of nuclear installations in operation is conducted in a comprehensive and systematic manner, taking into account the requirements of generally binding legal regulations and IAEA safety standards (especially GSR, SSR, etc.), ÚJD SR safety guides, international standards and other relevant documents. It utilizes the experience and lessons learned from the operation of NIs in the country and around the world, as well as results of development of science and technology. Legislative requirements for safety assessment are set for all phases of life cycle of the nuclear installation (siting, design, construction, commissioning, operation including long-term operation, decommissioning, Safety assessment shall be carried out by the licence holder in various forms, including assessments performed by their own staff, assessments by technical support organizations and international missions (e.g. IAEA, insurance associations), peer reviews (for example, WANO, ENSREG – Stress Tests, Topical Peer Review), tests, inspections, etc. Follow-up missions are regularly invited to monitor the implementation of safety measures aimed at enhancing nuclear safety.

The IAEA plays a significant role in the process of safety assessment and safety enhancement, as it issues safety standards and conducts missions aimed at reviewing the regulatory framework, design and operational safety of nuclear installations. The requirements contained in the safety standards and results of the IAEA reviews, are one of the prerequisites for establishing programs to enhance the safety of nuclear installations in SR.

The results of safety assessments are summarized by individual NIs in Chapter 3.

Probabilistic Safety Assessment (PSA)

Legislative requirements for the development and update of PSA for nuclear installations having a nuclear reactor are set out in Annex 1 par. C of the Atomic Act; in Annex 4., section B., II., par. C of the ÚJD SR Decree No. 430/2011 on the requirements for nuclear safety and in Section 20 of the ÚJD SR Decree No. 58/2006, laying down the details on the scope, content and the method of drafting documentation of nuclear installations needed for individual decisions. The methodology of development and reviewing PSA is based on the IAEA guides (such as, for example, Development and Application of Level 1 Probabilistic Safety Assessment for Nuclear Power Plants, Specific Safety Guide No. SSG-3, IAEA, April 2010; Development and Application of Level 2 Probabilistic

Safety Assessment for Nuclear Power Plants, Specific Safety Guide No. SSG-4, IAEA, May 2010), ÚJD SR guides, the US NRC guides (such as, for example, Individual Plant Examination: Submittal Guidance, NUREG-1335, U. S. Nuclear Regulatory Commission, August 1989; Evaluation of Severe Accident Risks: Methodology for the Containment, Source Term, Consequence, and Risk Integration Analyses. – NUREG/CR-4551, U. S. Nuclear Regulatory Commission, December 1993), OECD/NEA documents (Probabilistic Safety Analysis of other External Events than Earthquake, Report NEA/CSNI/R(2009)4, OECD, Paris, France (2009); Probabilistic Risk Criteria and Safety Goals, OECD Nuclear Energy Agency, Nuclear Safety, NEA/CSNI/R (2009), and other. PSA for NPP V-2 was updated in 2013 (PSA Level 1) and in 2015 (PSA Level 2). Both PSAs reflect the implementation of systems and guides for severe accident management. Their scope is summarized in Table 3.

Level 1	Level 2	Initiating	g events	Power operation	Shutdown unit
		Internal	External		
Yes	Yes	Yes	Yes	Yes	Yes

Table 3: Scope of the PSA study for NPP V-2

PSA for NPP EMO 1,2 was updated in 2018 – 2019. The updated PSA reflects the implementation of systems and guides for severe accident management. The scope of PSA is summarized in Table 4.

	Level 2	Initiating	g events	Power operation	Shutdown unit
Level I		Internal	External		
Yes	Yes	Yes	Yes	Yes	Yes

Table 4: Scope of the PSA study for NPP EMO 1,2

The results of PSA since 1994 show gradual decrease in the Core Damage Frequency (hereinafter only as "CDF") and the Large Early Release Frequency (hereinafter only as "LERF") achieved by increasing the safety of nuclear power plants. PSA is regularly reviewed within periodic safety reviews.

PSAs are reviewed by ÚJD SR, technical support organizations and the licence holder, and possibly by the IAEA missions. The results of PSA are used to assess safety, promote safety enhancements and promote safe operation.

PSA is also used to monitor real-time risk and NPP configuration management. The software tool evaluates the immediate operational risk (in EBO it includes also the spent fuel storage pool) based on the current or planned configuration of NPP. This allows the personnel to take operative decisions to minimize risk during operation and during maintenance at NPP. Both CDF and LERF are monitored.

Deterministic Safety Analysis (DSA)

The deterministic safety analyses are usually performed using computational programs. In Deterministic Safety Analyses, the response of the nuclear installation or its part to the events and

failures that are prescribed is examined, i.e. in a deterministic manner. Calculations are performed for all operating modes and states of the nuclear installation. They include expected operational events, design-basis accidents, and also accidents in an extended design conditions (without/with severe nuclear fuel damage). They cover both internal events and events caused by internal and external threats and their combinations. They include nuclear reactor and spent nuclear fuel pool. They consider a situation that a threat will affect all nuclear installations at the site. The result of the calculation is the time and space dependence of the monitored parameters (neutron and thermal output, pressure, temperature, flow-rate, fluid flow velocity, stresses in structural materials, physical and chemical composition of the atmosphere, concentration of radioisotopes, radiation doses and other). The results of the safety analyses are evaluated against acceptability criteria. Deterministic analyses are elaborated on the basis of relevant requirements of the ÚJD SR Decree No. 430/2011 on the requirements for nuclear safety and ÚJD SR Decree No. 58/2006, laying down the details of the scope, content and method of making documentation on nuclear installations needed for individual decisions. The evaluation methodology is based on relevant IAEA safety standards (such as for example, Accident Analysis for Nuclear Power Plants, Specific Safety Guide No. SSG-2, IAEA, Vienna, 2009 and SRS documents), international standards and codes.

The results of deterministic safety analyses show the fulfilment of the established acceptance criteria and adequacy of the safety margin considered in the design of NI.

Periodic Safety Review (PSR)

As described in 6.1.(c) I., requirements for periodic review are set out in the ÚJD SR Decree No. 33/2012 on periodic comprehensive and systematic review of nuclear safety of nuclear installations. Legislative requirements are specified in the follow-up safety guide of ÚJD SR. Periodic review is based on the relevant IAEA documents (such as, for example, Periodic Safety Review of Nuclear Power Plants, IAEA, Specific Safety Guide No. SSG-25, Vienna, 2013, Ageing Management and Development of a Programme for Long-Term Operation of Nuclear Power Plants, IAEA, Specific Safety Guide No. SSG-48, Vienna, 2018), as well as on WENRA reference levels. At present, there are 15 (16 in the par) areas of assessment (safety factors) reviewed. The latest nuclear safety reviews of NPPs was conducted in 2016 for NPP V2 and in 2018 for NPP EMO 1,2. The results of periodic nuclear safety reviews are used to demonstrate the safety of a nuclear installation for a period until the next periodic nuclear safety review. Another result from periodic nuclear safety review is an integrated plan of corrective actions to remedy the identified deficiencies. ÚJD SR controls its implementation.

6.1.(c) III. Methods and approaches of regulatory authority to verify implementation of the requirements by the licence holder

The development and updating of NPP safety documentation is done under the supervision of regulatory authorities. ÚJD SR reviews or approves the safety documentation, depending on the type of documentation. Legislative requirements for review/ approval of the safety documentation

are laid down in the Atomic Act. The review is usually carried out in a form of inspections according to the procedures of the ÚJD SR management system. When reviewing documentation and conducting on-site inspections, ÚJD SR also engages independent external contracted organizations, both domestic and foreign (analyses, expert opinions, opinions and tasks of science and technology development). Reviews and inspections are made with respect to the requirements of generally binding regulations of SR, requirements/recommendations of the IAEA safety standards, ÚJD SR safety guides, WENRA reference levels, international standards and other documents. The reviews include independent verification of safety analyses for selected event scenarios using computational programs. The results of reviews and inspections carried out by ÚJD SR are documented and made available to the public (e.g. results of the last PSR review).

ÚJD SR performs independent operational safety assessment using safety indicators. Also important in terms of operational safety, is the event analysis, aimed at preventing the recurrence of events and the use of experience at a national level. ÚJD SR also uses experience from events at international level (International Reporting System for Operating Experience IAEA, OECD/NEA).

6.1.(c) IV. Examples of safety measures implementation

NPP Bohunice – V-2

Programmes of NPP V-2 safety improvement - historical overview

The Programme on Modernization and Improvement of NPP V-2 (MOD V-2) safety which started in 1994 was not focused only on solving of safety issues but includes also the decision of operational issues connected with 15-years operation of NPP V-2 – physical wearing and moral obsolescence of devices, causing mainly at control systems and electric system problems concerning the operational reliability of devices, spare parts and service. The modernization programme included also measures focused on improvement of technical-economic parameters of NPP V-2 units, first of all the primary and secondary unit output regulation, improvement of efficiency and nominal unit output and improvement of their life of service.

Safety concept

MOD V-2 was based on measures concerning elimination of deficiencies of WWER reactors mentioned in the IAEA report: IAEA EBP-WWER-03 and required by decision No. 4/96 of ÚJD SR. The project change has been prepared since 1998 through elaboration of the Safety concept part 1. (1998 – 2000) and the Safety concept part 2. (2000 – 2001).

For each task of modernization of NPP V-2, project documentation in compliance with legally binding provisions and standards was made. All tasks performed within modernization were grouped according to their relevance to the problematic and their relation to various technological facilities in order to rank them to several operational files. Measures for elimination of safety problems, for innovation of equipment and for improvement of technical and economical parameters of units are implemented in these tasks.

Second Periodic Safety Review of V-2 NPP (PSR - 2016)

The reference date for the periodic safety review of V-2 NPP was 26 August 2016. Final Report on the PSR results for V-2 was submitted to ÚJD SR as at 30 August 2017.

The PSR strategy is based on a parallel evaluation of all areas under review, which are defined in the updated ÚJD SR Decree No. 33/2012, Section 2 par. 5. Each area is assessed in accordance with current safety standards and the requirements of current practice.

The scope of the periodic safety review corresponded with the requirements of the updated ÚJD SR Decree No. 33/2012, which in Section 5 requires for the individual areas under review to focus on explicitly listed aspects of assessment (valid as of 1 March 2019):

- 1. Design of nuclear installation;
- 2. Current status of nuclear installation;
- 3. Equipment qualification;
- 4. Ageing management;
- 5. Deterministic safety analyses;
- 6. Probabilistic safety assessment;
- 7. Unintended internal threat and unintended external threat to nuclear installation;
- 8. Operational safety of nuclear installation;
- 9. Use of experience from other nuclear installations and results of research;
- 10. Organization, administration and safety culture;
- 11. Quality Management System;
- 12. Operating regulations;
- 13. Human factor;
- 14. Emergency planning;
- 15. Radiological impact on the environment;
- 16. Long-term operation.

The conclusions were presented in the Periodic Safety Review Report of V-2 NPP.

Three time phases have been set by ÚJD SR for the corrective actions (CA) implementation plan:

T1 – Corrective Actions (CA) implemented by the end of 2019. Some of the measures of this phase will be implemented earlier or are already in progress within the licence holder's standard processes.

T2 – CA implemented by the end of 2022.

T3 – CA implemented by the end of 2025.

The deadlines, first of all take into account their safety relevance, as well as the real possibilities of their realisation.



Figure 8: Illustration of safety improvements. Source: ÚJD SR.

Interim Spent Fuel Storage - ISFS

Description of Used Technology

ISFS represents a nuclear installation serving to temporarily and safely store spent nuclear fuel from WWER reactors prior to its further processing in a re-processing plant, or prior to its final disposal in a repository. *It is designed as a wet storage*. It was commissioned in 1986. Its active operation began in 1987.

Spent fuel is transported to ISFS after ca. 3,6-year cooling in the at the reactor storage pools.

Programs of ISFS safety improvement

During the period 1997 to 1999 the Interim Spent Fuel Storage underwent an extensive reconstruction aimed at increasing its storage capacity, life extension and seismic reinforcement. The overall storage capacity of ISFS after reconstruction and seismic reinforcement has nearly tripled compared to its original capacity. Increasing its original capacity was allowed by replacing the original magazines of T-12 type with the KZ-48 type magazines and change in the geometry of storage of magazines. The storage capacity of 14,112 pcs of SNF after the reconstruction will not be sufficient for storage of all spent nuclear fuel produced during the operation of NPP V-1 Units (finished production of SNF) NPP V-2 and NPP Mochovce. Due to this reason Slovakia is currently working on preparatory works to build new capacity for storage of SNF.

The details of this program are contained in the National Report of SR elaborated in accordance with the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (https://bit.ly/3gHGJPy).

Conducted ISFS Safety Reviews

Internal safety reviews (within Slovakia) were performed during the construction and commissioning of ISFS and during its operation, by assessing and approving of safety-related documentation by regulatory authorities and SR organizations (safety reports, quality assurance programs, limits and conditions). Reports on ISFS operation, monitoring program results and overall conditions of ISFS are submitted to ÚJD SR on annual basis. No international safety reviews of ISFS have been conducted so far.

After 8 years of ISFS operation, a safety assessment report was prepared serving the purpose of decision-making with respect to extension of storage capacity.

Updated Pre-Operational Safety Report was drafted in 2000 in connection with ISFS reconstruction, which evaluated the actual safety status of the facility. The format of the safety report was based on recommendations of the US NRC Guide No. 3.44 Standard Format and Content for the Safety Analysis Report for an Independent Spent Fuel Storage Installation (Water - Basin Type), and ÚJD SR requirements and the IAEA safety series No-s. 116, 117 and 118.

Periodic Safety Reviews of ISFS

According to Section 23 par. (2) Act No. 541/2004 – Nuclear Safety and ÚJD SR Decree No. 49/2006 Coll. the company JAVYS inc. performed the periodic nuclear safety review of the Interim Spent Fuel Storage to the base term Nov. 30, 2008. Based on the results update of Pre-Operational Safety Report of this NI was performed in compliance with ÚJD SR Decree No. 49/2006 Coll. The updated Pre-Operational Safety Report was approved by ÚJD SR Decision No.158/2010. After updating the Pre-Operational Safety Report of the Interim Spent Fuel Storage, after the Periodic Nuclear Safety Review ÚJD SR issued its decision No. 444/2010 permitting the operation of the ISFS (Note: The amendment to the Atomic Act repealed the time limitation for validity of operating license for nuclear installations and are deemed as licenses without time limitation).

From 2018, the repeated periodic safety review of ISFS has been carried out. The review was performed in accordance with the legislation applicable as at 30 November 2018. The emphasis of the review was placed on meeting the requirements of ÚJD SR Decree No. 33/2012, and the relevant ÚJD SR safety guide.

As a result of PSR, integrated corrective actions with low safety significance were proposed.

6.1.(d) Management system giving due priority to nuclear safety (Art. 6 (1d)

6.1.(d) I. Requirements of the national framework of IMS prioritising nuclear safety for licence holders

Quality management systems of licence holders are developed and introduced in a form of Integrated management system (hereinafter only as "IMS"). It is a management system that meets the requirements for the safety management, quality and protection of the environment, in accordance with the IAEA safety standards GSR Part 2, GS-G-3.1.

The IMS is the cornerstone for determining the integrated policy and objectives of the company and the method of their fulfilment in an efficient and effective manner. At the same time, it ensures the fulfilment of all relevant requirements of stakeholders, such as, for example, customers, owners, the public, suppliers, but also its own employees.

In line with the characteristics of a healthy safety culture (according to WANO PL 2013-1) the IMS provides a process model, organizational structure and direction of the company in a way that promotes the development of safety culture, along with achieving the highest level of safety.

Main principles of IMS are specified in 6.1.(d) II.

The basic requirements that the IMS must meet, are the generic requirements of international standards ISO 9001.

IMS is based on process approach and customer orientation, the process owners are identified, processes are hierarchically arranged and divided into three groups (management processes, key / main processes, supporting processes) with identification of processes relevant to nuclear safety.

Legal framework:

- legislative requirements set out in the Atomic Act, the follow-up implementing decrees issued by ÚJD SR,
- IAEA Safety Standards in particular GSR Part 2 Leadership and Management for Safety etc.,
- recommendations from the peer reviews and missions of international organizations (WANO, OSART) and inspections by the regulators, such as for example, ÚJD SR, NIP and others,
- experience and information gathered from the self-assessments and benchmarking realized in cooperation with the foreign nuclear operators,
- advice and experience of local and foreign consulting and advisory firms, results of benchmarking (comparing with the best), continuous improvement projects.

6.1.(d) II. Verification of the effectiveness of the Integrated Management System

Policies declared and implemented by the NPP operator

The overall intents and direction in the field of quality, environmental protection, safety (occupational health and safety, nuclear safety, radiation protection), corporate security (crisis management, including emergency preparedness and planning and general security) and human resource management are set out in the Integrated Corporate Policy.

The Integrated Corporate Policy takes into account the requirements of the international standards, national legal framework and the safety standards of international organizations (for example, the IAEA, *GSR Part 2*, GS-G-3.1).

In order to fulfil the Integrated Corporate Policy, there are company objectives set for the individual years (Key objectives for the year).

The key objectives for the relevant year are proposed by the managers responsible for individual processes and are approved by the company management.

The key objectives for the relevant year are broken down to individual plants by the plant managements.

Objectives are defined so as to be:

- With deadlines, measurable, and so that they can be evaluated,
- Reasonably achievable,
- Comprehensible,
- Usable and appealing to the company,
- Economically justifiable.

The basic tool for fulfilment of the Integrated Policy and objectives is maintenance and improvement of the IMS.

The top management of the company creates conditions and prerequisites for the implementation, maintenance and improvement of IMS by defining an Integrated corporate policy, providing the necessary resources (human resources and organizational infrastructure, technology, technical, financial resources, etc.), appoints the representatives of the management – for IMS, or for the individual management systems – quality, safety, environment at plants, conducts review of IMS at specified intervals to ensure its continuous suitability, adequacy and effectiveness.

The main principles of IMS are the following:

- Each employee is responsible for the quality of his/her work,
- All activities having impact on the quality, are performed in compliance with the applicable regulations,
- IMS builds on good practice in the management system, as well as the best domestic and international experience,
- The management is responsible for development, introduction, continuous monitoring and evaluation of the efficiency and for further development of IMS, including staff training,
- IMS is built as a single management system that includes all the activities undertaken and the processes, relevant to the achievement of organizational goals.

The IMS also includes the following principles, approaches and values:

- Safety is paramount, every employee is personally responsible and makes a contribution to increasing the safety standard,
- Focus on prevention, continuous improvement and learning,
- Support for optimal processes with an appropriate organizational structure,
- Providing information about process performance and the performance of the whole company,
- Use of the results and proposals from the ongoing projects for continuous improvement of IMS,

• Focus on internal and external customers, providing information on customer satisfaction and of other stakeholders, flexible response to the legitimate demands of the stakeholders.

All activities within the identified IMS processes are managed so as to minimize the negative impacts on the environment, the health and safety of the population and to comply with the *applicable legislation of the SR*, permits and decisions issued by the competent authorities of state regulation.

Efficiency of the IMS, including the quality system, is verified through:

- internal audits conducted within the integrated management system,
- certification and supervisory audits by external accredited certification companies,
- inspections conducted by ÚJD SR and controls performed by other regulatory authorities.

Findings from audits, inspections or controls are consistently and thoroughly analysed on the relevant levels. Based on the analyses, effective and efficient corrective and preventive measures are taken, the implementation of which is regularly checked. Results are submitted for discussion to the company management. The findings are an important source for continuous improvement of the integrated management system.

Quality Management System Audits at Suppliers

Licence holders perform *external* audits of Quality Management Systems of selected contractors affecting nuclear safety, during which they verify the effectiveness in applying requirements of their Quality Management Systems according to the *relevant* ISO standards and specific *nuclear safety* requirements arising from *legislative requirements* and IAEA safety standards. Requirements for contractors are reflected in the contracts and their General Business Terms and Conditions, or Safety and Technical Conditions for Performance, which are attached to the contracts. The purpose of these audits is to ensure quality and reliable contractors for safe, reliable, ecological and efficient energy production, *and decommissioning of NIs, SNF management, RAW management, institutional RAW management and captured radioactive materials*.

Role of regulatory authorities

The activity and the tasks of ÚJD SR in the field of quality assurance, is established by the Act No. 541/2004 Coll. (Atomic Act), ÚJD SR Decree No. 431/2011 Coll. on the quality management system and by ÚJD SR Decree No. 430/2011 Coll. on the requirements for nuclear safety. ÚJD SR Decree No. 430/2011 Coll. specifies the details of the requirements for nuclear safety of nuclear installations during their siting, design, construction, commissioning, operation, decommissioning and when closing a repository, as well as criteria for categorization of classified equipment into safety classes. Requirements for classification of classified equipment of nuclear installations into safety classes from I to IV are divided according to the type of safety function, which they provide. ÚJD SR Decree No. 430/2011 Coll. at the same time sets the requirements for the form and content of the lists of classified equipment approved by the Authority.

In exercising state regulation in the field of quality assurance ÚJD SR concentrates on four basic activities:

- Review and approval of quality management system documentation.
- Review and approval of requirements for quality and requirements for quality assurance.
- Review and approval of changes in the quality management system.
- Inspections of the quality management system and fulfilment of requirements specified in the quality management system documentation of the licence holder.

During inspections in the field of quality assurance, the ÚJD SR inspectors check on how the operators, according to the Atomic Act and Decree No. 431/2011 Coll. and the conditions set out in the Decisions issued by the ÚJD SR, and how do they comply with the approved documentation of the quality management system and the requirements for quality. The inspection activity of the inspectors, upon approval of the relevant document, focuses on checking fulfilment of its individual requirements and practical implementation of requirements, i.e. observance of the approved documented procedures and actual activities. The inspector prepares a record or protocol on the inspection and discusses it with the responsible organization.

In case of any deficiencies identified on the selected equipment, in activities or the documentation the inspector is authorized to impose measures for their removal. Inspections are carried out according to the approved program; they have their objective and a specified form of their documenting.

Labour inspection from the Labour Inspectorate Nitra focuses on the Quality Assurance Systems from the point of occupational health and safety consist of control of legal entities and natural persons performing certain activities (production, installation, repairs, reconstruction, inspections, tests, revisions, maintenance, import of equipment, ...) on equipment being subject to labour inspection. During verification of competence the Quality Assurance System is also subjected to it, respectively the documentation, records, physical state of the technical equipment of legal entities and natural persons.

6.1.(e) Appropriate on-site emergency procedures for responding to accidents (Art. 6 (1e)

6.1.(e) I. National framework requirements for appropriate emergency procedures and measures of licence holders

The Atomic Act in Section 23, par. 2 stipulates that the licence holder is obliged to establish appropriate on-site emergency procedures and measures, including guidelines for severe accident management, for effective response to incidents and accidents aimed at preventing or mitigating their consequences; these procedures and measures:

1. must be consistent with other operating procedures and be regularly practiced to verify their practicability;

2. are intended to deal with accidents and severe accidents, which may occur in all modes of operation, as well as those, which occur simultaneously in several NIs or which may effect several NIs;

3. ensure the receipt of external assistance; and

4. must be regularly assessed and updated in the light of experience from emergency exercises and lessons learned from accidents.

According to Section 10 par. 1 of the Atomic Act, the licence holder is obliged to draw up on-site emergency plan and emergency traffic regulations, as well as documentation for protection of the population.

Details of the content of emergency plans, details of the procedure for their submission and approval, measures, procedures and activities, including determining the severity of events according to international criteria, details of informing the authorities and the general public, details of the requirements for the documentation needed for application for approval of the size of the emergency planning zone, size of the common emergency planning zone, including the deadline for submitting an application, details of monitoring system, details of training, exercising and updating emergency plans, details of provided data and the time course of the incident or accident at nuclear installations and during transports of radioactive materials, are stipulated in the ÚJD SR Decree No. 55/2006 on details of emergency planning in the event of an incident or accident.

Annex 3, Part B. I, section F of ÚJD SR Decree 430/2011 on requirements for nuclear safety, contains general requirements for the design of a nuclear installation for design-basis accidents. The design must include measures to automatically initiate the operation of necessary safety system, if a rapid and reliable response to the postulated initiating event is required to avoid a transition to a more serious condition that could jeopardize the next level of defence-in-depth. The design must allow for the manual initiation of systems or other interventions of selected staff necessary to diagnose the condition of a nuclear installation, and to bring it to a stable long-term shutdown condition in a timely manner, provided that the need for intervention is identified in a timely manner, and that appropriate procedures are in place to ensure reliability of such interventions, including adequate instrumentation to monitor the condition of the nuclear installation, and controls to manually control these systems.

Annex 3, part B II section E of the ÚJD SR Decree 430/2011 contains requirements for severe accidents. Based on operational experience, relevant safety analysis and research results, the design must also focus on accidents in the context of extended design with nuclear fuel melting, taking into account:

 A set of selected events that are determined from postulated initiating events using a combination of probabilistic methods, deterministic methods and technical assessment, and which were subsequently examined using a set of criteria to determine, which accidents will be covered by the project;

- Evaluation and implementation of possible design modifications or changes to the documentation or operating procedures, which could reduce the probability of occurrence of selected events or mitigate their consequences, if their implementation is reasonably possible;
- Wording of operating procedures for the management of emergency conditions during their course.

Severe Accident Management Guidelines (SAMG) are intended to mitigate the consequences of severe accidents, when the measures set out in the procedures for emergencies have not been successful in preventing nuclear reactor core damage. SAMG are developed in a systematic way, using a facility-specific approach. They contain strategies for managing scenarios of emergency conditions identified in severe accident analyses.

Procedures for dealing with emergencies and SAMG are verified and validated in the form, in which they are used on-site to ensure that they are administratively and technically correct and consistent with the environment, in which they will be used. The licence holder must carry out regular checks of operating procedures, applying experience of his own operation, including periodic simulator training, and of operation of other comparable nuclear installations, as well as current scientific and technical knowledge.

6.1.(e) II. On-site emergency arrangements

Internal emergency plans and related documents are designed to ensure protection of employees and other organizations working in the territory of NI in case of an event at NI, while measures must be taken to protect the health of persons within the territory of NI or for the population in its vicinity. Respond to multi-unit events is specified in Chapter 6.1.(e) IV.

The purpose of the internal emergency plan is to provide for the preparedness of the NI staff for the implementation of planned measures in case of event at the NI with personnel, technical equipment and documentation, with the emphasis on securing the basic objectives:

- to reduce the risk or to mitigate the consequences of event on the equipment, staff and the population in the vicinity of NI,
- prevent severe health damages (e. g. death or severe injury),
- reduce the risk of probable occurrence of stochastic effects on health (e. g. cancer and serious hereditary phenomena).

The aim of the on-site emergency plan is to provide for Emergency Response Organization (hereinafter only as "ERO") activities, i.e. planning and preparation of organizational, personnel, material and technical means and measures to successfully manage crisis and emergency situations according to the classified event.

Licence holders for operation have ERO consisting of units that are responsible for, in particular:

• on-site emergency response management,

- technical support,
- logistical support and protection of personnel,
- information for state authorities and the public,
- monitoring radiological situation, including forecast of its development and records on received doses.

6.1.(e) III. Methods and approaches applied by the regulatory authority to verify the state of implementation of the requirements by the licence holder

Pursuant to Section 31 of the Atomic Act, the Authority checks compliance with the Atomic Act and other generally binding legal regulations issued on its basis, as well as compliance with the scope and conditions specified in the decisions, and fulfilment of measures to eliminate deficiencies specified in the protocols, through inspections at licence holders. Inspectors are civil servants authorized by the Authority to perform inspections. The inspector is authorized to (inter alia):

- at any time enter without restriction the premises of licence holders and the premises of NIs and participate in the investigation of operational events and events during transport of radioactive materials;
- require the submission of documentation, records or other documentation necessary for the performance of inspection activity, and request copies thereof and the provision of information and explanations;
- require information demonstrating the fulfilment of obligations of the licence holder to secure and maintain financial and human resources with the appropriate qualifications and competencies necessary to perform the obligations under the Atomic Act, including appropriate working conditions and necessary engineering and technical support activities in all areas related to nuclear safety, etc.

6.1.(e) IV. Severe Accident Management Guidelines - implementation

In the period 2002 – 2004, a joint project *for V-2 NPP and EMO* was implemented to develop guidelines for dealing with severe accidents, Severe Accident Management Guidelines (SAMG). SAM Guidelines were developed in cooperation with Westinghouse Electric Belgium (WEB), in order to ensure maximum consistency with the regulations for *dealing with emergencies* and to cover the area of dealing with accidents of all severity levels. SAM Guidelines *are* used in the *technical support centre* and at the Unit control room. The guidelines were being developed for the state of V-2 and Mochovce after making a set of hardware modifications securing a higher success probability of applicable strategies. For this reason, the implementation of SAMG was tied to the implementation of hardware modifications.

The NPP V-2 has implemented the project "Severe Accident Management" to implement hardware modifications required to use SAMG. Under this project, SAMG guidelines were updated and

introduced in the Technical Support Centre (external assistance). SAMG of NPP V-2 were introduced after training of the staff, in 2013.

For NPP Mochovce, during implementation of HW modifications in 2015, SAMG were revised to reflect the actual state of equipment and the training of EMO 1,2 personnel started. Job positions for SAM technology experts have been created and staffed by the required number of staff assigned to the structures of the external Technical Support Centre. From 2016, SAMG have been implemented and used at EMO 1,2. Between 2016 and 2018, due to changes in generic guidelines of Westinghouse Electric Belgium (WEB) after Fukushima, SAMG were revised and subsequently validated in 2018. SAMG were revised and validated also for V-2 NPP.

Capability to manage severe accident in case of simultaneous core melt/fuel damage in different units of the same site (multi-unit events)

Another task in the field of Severe Accident Management was to analyse the SAM project in terms of manageability of severe accident occurring at all nuclear Units on site at the same time (fuel placed in reactor core and in the storage pool).

Part of the task was to prepare a report "Management of severe accidents on all units on site", which identifies potential areas for improvement, both in organizational support of managing the accident, and in adequacy of HW resources. SE, a. s., developed a self-assessment in management of severe accidents according to the latest criteria of the World Association of Nuclear Operators (WANO). Under this self-assessment a corrective action plan was developed.

The Action Plan includes measures as lessons learned from the accident at NPP Fukushima Daiichi in case of possible damage to infrastructure, including disruption of communication at the level of plant, company and the State, long-term accidents (lasting several days) and accidents having impact on several units and on adjacent industrial facilities.

Analysis of this project was done by the end of 2015.

6.1.(f) Financial and human resources of licence holders (Art. 6 (1f)

6.1.(f) I. Financial resources

6.1.(f) I.a) Requirements for financial resources of licence holders

The Act No. 541/2004 Coll. (Atomic Act) provides for: to maintain financial resources and human resources for ensuring nuclear safety, including appropriate working conditions and the necessary engineering and technical support in all areas relating to nuclear safety.

In addition, ÚJD SR Decree No. 431/2011 Coll. on quality management system requires that the quality management system should contain provisions for the availability of financial, material, technical, human, etc. resources.

6.1.(f) I.b) Confirming the adequacy of financial resources of licence holders

One of the principles of nuclear and radiation safety of *licence holders* is the commitment by the *licence holders* to have available the necessary financial resources to meet the requirements for
nuclear and radiation safety and for providing for continuous improvement in education and qualification of staff. In order to fulfil this commitment, financial strategies of companies have been established.

Financial strategy of licence holders is defined as securing financing of operational and investment needs of the company with optimal utilization of own and external resources (*e.g. bank loans*).

Act on Nuclear Fund sets the rules for management, contributions and the use of the Fund. The basic source of the Fund is an obligatory contribution from licence holders operating nuclear installations that generate electricity. With the adoption of the new Act on the National Nuclear Fund (hereinafter only as "NNF") effective from 1 January 2019, the original system of mandatory contributions for each megawatt of installed capacity and on the selling price of produced electricity in nuclear installation was replaced by a new mechanism consisting of mandatory contributions based on total financial needs for decommissioning of a nuclear installation, including RAW management and the share of costs for disposal of SNF and RAW. In addition, the new Act on National Nuclear Fund has also introduced mandatory payments for nuclear installations in operation, not intended for power generation, also on the basis of the need to accumulate funds to cover decommissioning costs, the costs of RAW management, including their final disposal.

6.1.(f) II. Human Resources

6.1.(f) II.a) Requirements for human resources of licence holders

High quality of human resources is *a* basic prerequisite for safe, reliable, economical and ecological operation of nuclear installations. The term "high quality human resources" means a summary of professional, health and mental capacity of employees for performance of work activity with licence holders. From the view of influence of work activities on nuclear safety the staff of the licence holders are divided into two basic groups:

- Employees having direct impact on nuclear safety selected employees, whose special professional competence is verified by an exam (written exam, oral exam and verification of competencies on a representative full-scale simulator) and a practical exam before an examination committee for selected employees, which is established by ÚJD SR, which issues License of Special Professional Competence;
- Employees having impact on nuclear safety professionally competent employees, whose
 professional competence was verified by an expert committee established by the operator of
 a specialized facility in a form of written and oral exams and which issues a Certificate
 of Professional Competency. Depending on the nature of works they are divided to daily and
 shift professionally competent employees.

Special professional competence of employees according to Atomic Act means a summary of expertise, practical experience, principal attitudes and knowledge of generally binding legal regulations and operating procedures issued by the licence holder for ensuring nuclear safety, which is necessary for performing work activities having direct impact on nuclear safety.

Professional competence means summary of expertise, practical experience, knowledge of generally binding legal regulations and operating procedures issued by the licence holder and necessary for performing work activities of licence holder' employee. Professional competence is acquired by successful completion of training at a specialized facility.

The licence holder is responsible for the overall work, professional, health and mental capacity of its staff to perform work activities at nuclear installations. The licence holder is responsible for the capability of his employees to perform work activities at nuclear installations. For every selected and professionally competent employee a "License to perform work activities" is issued as part of integrated management system (IMS) of quality assurance for nuclear installation – licence holder. License to perform work activities is issued for the given job position and *for* a specific nuclear installation only for those selected and professionally qualified staff of the licence holder, who hold valid certificates of special competence or certificates of professional competence *and completed the relevant type of training*.

6.1.(f) II.b) Confirming adequacy of human resources of licence holders

The Atomic Act in § 25 para (5) provides that the licence holder shall provide financial, technical and human resources to develop and maintain the quality management system, while these resources must be in accordance with the resources for securing nuclear safety. As for the number of staff of NI, the Atomic Act states in Section 7 *that a special condition for issuing a permit pursuant to Section 5 par. 3 (a) to c), f), g) of the Atomic Act, is the approval of Limits and "Conditions of Safe Operation" (L&C).*

ÚJD SR Decree No. 58/2006 Coll. on the scope, content and method of preparation of documentation requires that the L&C determines the minimum number of employees during a shift and *their assignment to work positions.*

According to par. 5 of ÚJD SR Decree No. 52/2006 on professional competence, the licence holder when determining the required number of positions according to par. 2 of Section 2 of the Decree, the competencies and number of employees pursuant to Section 3 par. 3 of the Decree is based on a systematic analysis, which is regularly verified and documented according to the rules of Quality Management System.

ÚJD SR Decree No. 431/2011 Coll. on quality management system § 4 determines that quality management documentation of the licence holder shall contain (inter alia) the organisational structure and its description. § 9 of the same decree determines, that any changes to the documentation shall be justified, carefully planned and after their implementation evaluated. The quality management system and its changes are subject to approval by ÚJD SR.

6.1.(f) III. Contractors and sub-contractors

6.1.(f) III.a) Requirements for contractors and sub-contractors

Under Atomic Act, Section 23, par. 2, the licence holder is obliged, inter alia, to ensure that contractors and subcontractors, whose activities could affect the nuclear safety of a nuclear installation, have the necessary human resources with appropriate qualification and competence to perform these activities. Chapter 6.1.(d) II discusses more details of this provision.

6.1.(f) III (b) Confirming adequacy of human resources of contractors and sub-contractors

Pursuant to Section 23 par. 2 (b) of the Atomic Act, the licence holder is obliged to ensure that contractors and sub-contractors, whose activities might affect nuclear safety of a NI, have the necessary human resources with a relevant qualification and competence to perform these activities.

Contracts with requirements for contractors are specified in 6.1.(d) II.

7 Expertise and skills in nuclear safety

Article 7

Member States shall ensure that the national framework requires all parties to make arrangements for the education and training for their staff having responsibilities related to the nuclear safety of nuclear installations so as to obtain, maintain and to further develop expertise and skills in nuclear safety and on-site emergency preparedness.

7.1 Licence holders – education, training and retraining

Pursuant to Decree 52/2006, the licence holder is obliged to determine all job positions, in which work activities with an impact on nuclear safety, and other positions with direct impact on nuclear safety are performed, together with a description of work activities in the Quality Management System documentation, including their required number. The professional competence of staff is verified by an exam in front of an expert commission set up by the operator of a specialized institution after completion of the training.

In the system of professional training each position has defined requirements for education, experience, training, health and mental capacity. The direct supervisor of the employee is responsible for meeting these requirements.

System of professional training of employees of the licence holder is updated on the basis of operational experience, implemented organizational changes, technical solutions (modernization) carried out on the equipment, and requirements of regulatory bodies, audits, reviews and recommendations of internal and external organizations, for example the IAEA, WANO, *INPO*. This is provided for by necessary human, financial and material resources.

Professional training of staff of the licence holder, as well as for the third parties (the third parties are contractor organizations) is carried out in compliance with the documentation *Integrated Management System*, developed and maintained in accordance with:

- Generally binding legal regulations;
- The IAEA, WANO, INPO standards and guides;
- STN EN ISO 9001, ISO 14001, ISO 45001, ISO 31000 and ISO/IEC 20000-1 standards;
- Management documentation of the Quality System.

Management documentation contains following items:

- Selection and assignment of employees to positions;
- Definition of training objectives,
- Description of methodology used for training, based on systemic approach,
- Development of employees;
- Acquisition and maintenance of general competencies of contractor staff;

- Description of the training documentation management and training records,
- Division and definition of competencies and responsibilities of staff in relation to their training.

Fig. 9 shows the distribution of staff and their training according to their impact on nuclear safety.



Figure 9: System of training of employees

In terms of an impact on nuclear safety, employees are included into the relevant type and phase of training and divided according to performed work activities, into *ten* categories, which are further divided into professional groups, *according to their professional focus in SE, a.s. (Table 5):*

Category I – Selected employees performing work activities with direct impact on nuclear safety:
 Secondary circuit operator
Primary circuit operator
 Head of reactor unit
Shift supervisor
 and OSZ performing work activities with impact on nuclear safety, such as:
 Lecturer for RP simulator training
 Specialist for nuclear safety analyses
Category I – OSZ performing work activities with impact on nuclear safety:
 Safety management engineer – nuclear safety
 Equipment reliability specialist
System engineer
Project engineer
Basic design configuration specialist
Category II+ – OSZ performing work activities with impact on nuclear safety:
 Safety management engineer – SZ
Component engineer
 Equipment/simulator administration technician
Category II – all other OSZ – management employees, specialists, engineers, technicians, technologists, foremen, or others, performing managerial, technical, engineering, control, maintenance activities with impact on nuclear safety.
Category III – OSZ – field operator, locksmiths, electricians, mechanics, radiation control technicians and other, performing operator, maintenance and control activities with impact on nuclear safety.
Category F – selected employees performing work activities with direct impact on nuclear safety: Control physicist
Category S – selected employees performing work activities with direct impact on nuclear safety: Scientific head for start-up without the right of handling
Category M – OSZ – managerial staff performing work activities with impact on NS:
 Section and Plant Directors
 Managers of centralized units
Senior staff of Procurement Section 30000
Category T – Foreign OSZ performing work activities with impact on NS in non-managerial positions (technicians, technologists, specialists, etc.).

Category VI – other employees performing activities without impact on NS.

Table 5: Categories of employees of the licence holder, SE, a.s.

For the licence holder, JAVYS, a. s., employees are divided according to their impact on nuclear safety as follows:

Work activities with an impact on nuclear safety of NI are performed by professionally competent staff included in category V training, working in the following job positions:

- Division directors,
- Heads of units,
- Heads of sections,
- Heads of departments,
- Technical-administrative staff (technicians, technologists, specialists, clerks),
- Foremen,
- Operators and maintenance staff.

Category V (a-e) includes professionally competent staff from profession groups of the licence holder, who perform activities related to operation of nuclear installations TSÚ RAO, ISFS, NRWR, IS RAO and FS KRAO and decommissioning of A-1 NPP and V-1 NPP.

Employees performing activities related to the operation of TSÚ RAO, ISFS, IS RAO, NRWR, FS KRAO and decommissioning of A-1 NPP, stage 3 and 4.

- V.a) leading and managing staff, specialists and technical-administrative staff of asset management, technical and operational units
- V.b) executive staff of units of asset management, technical and operational units

Employees performing activities in stage 2 of decommissioning of V-1 NPP

- V.c) leading and managing staff, specialists and technical-administrative staff of asset management, technical and operational units of V-1 NPP
- V.d) executive staff of units of asset management, technical and operational units of NI V-1 NPP

Employees performing activities common for all NIs of JAVYS, a. s.

V.e) leading and managing staff, specialists and other professionally competent staff, performing activities common for all NIs of JAVYS, a. s.

Operator of a specialized facility (training facility)

Training of employees of the licence holder, and if necessary, also employees of contractor organizations, is carried out by the operator of a specialized facility, which is a holder of a permit for training of employees of the relevant licence holder, issued by ÚJD SR. The training is carried out in accordance with the approved training system for employees of licence holders and in accordance with the relevant training programs for the professionally competent staff or selected staff prepared by the operator of the specialized facility. The training is performed in compliance with the approved system of training according to the staff training programs. The following full scope simulators are available:

- at VUJE, a. s. in operation and Unit 3 of NPP Bohunice is a referential unit,
- at NPP EMO 1,2 in operation and Unit 1 of NPP Mochovce 1,2 is a referential unit,
- at NPP MO34 under construction and Unit 3 of NPP MO34 is a referential unit.

The main upgrade was done on the representative full-scale simulator of NI EMO in 2013. Similar upgrade was implemented in 2013 and 2014 also at the representative full-scale simulator of NI EBO at VUJE, a. s. During 2019 – 2020 the representative full-scale simulator of MO34 was upgraded for the needs of commissioning of Unit 3 of EMO.

7.2 Regulatory authority – education, training and retraining

ÚJD SR, as a Service Office according to Section 15 par. 1 (a) of Act No. 55/2017 Coll. on Civil Service plans, organizes, secures and creates conditions for training of civil servants. The Decree

of the Government Office No. 126/2017, lays down the details on the education and training of civil servants, as amended. The process of training of ÚJD SR's employees is regulated in more detail by an internal directive specifying the details of the training of civil servants and employees performing work in public interest.

Every year, the service office draws up a plan for continuous education for a calendar year, which is regularly evaluated.

The focus of continuous education is developed based on the professional competencies of a civil servant stated in the description of the civil servant position.

Activities to support the performance of regulatory activities

ÚJD SR approves and evaluates the annual training program of its employees. In addition, ÚJD SR has a training software at its disposal, LMS i-Tutor, which includes a training and testing module according to the demands and requirements for training. The system is on the office server and each employee has its own access code. Employees can thus deepen their knowledge of general overview (legislation, international relations, etc.) as well as their own specialisation (operation, decommissioning, RAW management, emergency planning, etc.). This is a form of e-learning (Computer Based Training) for employees as self-study.

Performance of ÚJD SR is enhanced with its participation on solution and financing of science and research tasks solved within international cooperation and supported by the European Commission (SARNET), at the OECD NEA (PKL3 Project) or agreed within bilateral cooperation (ÚJD SR – US NRC).

8 Transparency

Article 8

 Member States shall ensure that necessary information in relation to the nuclear safety of nuclear installations and its regulation is made available to workers and the general public, with specific consideration to local authorities, population and stakeholders in the vicinity of a nuclear installation. That obligation includes ensuring that the competent regulatory authority and the licence holders, within their fields of responsibility, provide in the framework of their communication policy:

 a) information on normal operating conditions of nuclear installations to workers and the general public; and

b) prompt information in case of incidents and accidents to workers and the general public and to the competent regulatory authorities of other Member States in the vicinity of a nuclear installation.

- 2. Information shall be made available to the public in accordance with relevant legislation and international instruments, provided that this does not jeopardise other overriding interests, such as security, which are recognised in relevant legislation or international instruments.
- 3. Member States shall, without prejudice to Article 5(2), ensure that the competent regulatory authority engages, as appropriate, in cooperation activities on the nuclear safety of nuclear installations with competent regulatory authorities of other Member States in the vicinity of a nuclear installation, inter alia, via the exchange and/or sharing of information.
- 4. Member States shall ensure that the general public is given the appropriate opportunities to participate effectively in the decision-making process relating to the licensing of nuclear installations, in accordance with relevant legislation and international instruments.'.

8.1.(a) Information on normal operating conditions of NIs (Art 8 (1a)

8.1.(a) I. Legal requirements to licence holders and regulatory authorities for making information available

The access to information is guaranteed by the Constitution and other instruments on human rights since the early 1990's. The Act No. 211/2000 Coll. (Freedom of Information Act) provides the *public* with a statutory way of obtaining necessary information. This Act, together with the Atomic Act, Act No. 24/2006 Coll.I. on environmental impact assessment and Act No. 205/2004 Coll.I. on collection, storage and dissemination of environmental information *form the legislative framework for communication with the general public in the field of nuclear energy. The Environmental Impact Assessment Act transposes the EU Directive in this area (Council Directive 85/337/EC of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment, as amended), as well as the Aarhus Convention, <i>not only in the field of informing public, but also public participation in decision-making processes in matters of environmental protection.*

The *licence holder* shall be obliged by course of Act No. 541/2004 Coll. (Art. 27 (4)) to notify ÚJD SR of occurrences at operated installations and, in case of an incident or an accident, pursuant to Art. 28 (3) thereof also to inform the public. Among the obligations, the *licence holders*, according to the Atomic Act (Section 10, par. 11) *are informing* the public through *their* web site, press or other publicly accessible ways, always as at 30 April, also on assessment of nuclear safety of their installations for the past calendar year.

8.1.(a) II. Communications policy of regulatory authorities and the licence holder

Operation, safety improvements at NPP Bohunice V-2 and NPP Mochovce EMO 1,2, as well as construction of Units 3&4 of Mochovce, or the operation of nuclear installations designed for radioactive waste management, significantly influenced the life in the regions, which necessitated the intensification of communication with the regions in the vicinity of NIs, as well as at national level. Transparent information on all aspects of construction, operation and decommissioning of NI (including the operation of NI for the treatment and disposal of radioactive waste) and the disclosure of information by publicly available channels has become an integral part of open policy of licence holders and regulators in the field of information and stakeholder participation in the decision-making processes. The most important communication channels of licence holders and regulatory authority include:

- Information Centres of SE, a.s.: Bohunice (2 4 thousand visitors per year) and Energoland Mochovce (12 – 15 thousand visitors per year) + site visits to MO34 construction site for students of Slovak technical universities, for local government representatives, for members of the parliamentary economic committee, for experts of the Austrian Government, etc.,
- Information Centres of JAVYS, a. s., in Mochovce and Jaslovské Bohunice sites, average annual visit of approx. 5,000 visitors + tours of individual facilities for selected groups
- Bi-monthly SE, a.s., "Energy for the country" (formerly: atóm.sk) and the periodical "JAVYS with us", distributed free of charge in the Mochovce and Bohunice regions, and other printed materials (information brochures and leaflets in Infocentres and on the websites of licence holders), containing information in a comprehensible form,
- Websites of licence holders <u>www.seas.sk</u>, <u>www.javys.sk</u> and the regulatory authority ÚJD SR – <u>www.ujd.gov.sk</u>,
- Social networks Facebook, LinkedIn, YouTube, Instagram, Twitter,
- Portal <u>www.slovensko.sk</u> Central Official Electronic Notice Board (CÚET), on which ÚJD SR publishes prescribed information and which works as a nationwide communications point for all state administration bodies in relation to the general public,
- Touch Information Kiosk of ÚJD SR, which fulfils the function of the Official Notice Board of ÚJD SR – allows easy viewing of administrative proceedings and decisions issued by ÚJD SR, accessible to the public 24 hours a day, installed in 2016,

- Mochovce and Bohunice Civil Information Commissions (hereinafter only as "CIC") composed of elected and other representatives of the regional public. CIC members have regular meetings with the operators management and thus obtain qualified first-hand information,
- regional associations of towns and municipalities which communicate and tackle their problems in concurrence with NI operators in a given region,
- programs of local sponsorship of licence holders, cooperation in a form of advertising partnership of licence holders at events organized by affected municipalities, which help in areas, where municipalities need it most, and which bring benefits (education, health care and charity, culture, sports, environment),
- Occasional events for employees and the general public organized by SE, a.s., and JAVYS, a. s., such as, for example: Night in Energoland, Family Safety Day, Open Doors, sports games, etc.,
- External lectures at schools and other events, e.g. Ekotopfilm festival, through which licence holders can reach out to more than 15 thousand primary and secondary school students,
- others: seminars for journalists, mayors and local-government officials; press conferences and briefings in major happening, press releases for the media, active involvement in domestic and foreign exhibitions, conferences, *festivals* etc.

ÚJD SR provides information upon request and at the same time makes public information on the state of nuclear installations in the Slovakia and on its regulatory activities, thereby allowing the public and the media to check data and information on both nuclear installations and ÚJD SR. In addition to the aforementioned information, ÚJD's SR website (www.ujd.gov.sk) also publishes the initiated, pending and closed administrative proceedings according to the Code of Administrative Procedure, as well as the Decisions issued by ÚJD SR in full, together with justification. *In addition, ÚJD SR publishes important information on the portal www.slovensko.sk,* through CÚET. ÚJD SR also has a touch information kiosk, fulfilling the function of the Official Notice Board of ÚJD SR, where it is possible to view the administrative proceedings of the Authority (closed and pending), as well as decisions issued by the Authority. The website of the Authority is also available to the public here. The touch information kiosk is located at the ÚJD SR headquarters in Bratislava – in front of the building and is accessible to the general public 24 hours a day.

ÚJD SR holds competencies in respect to keeping the public informed on nuclear safety matters and monitors other media sources with a view to getting the necessary overview of information policy on a given subject. ÚJD SR independently from *NIs licence holders* provides information on nuclear safety of nuclear installations, including information on the management of radioactive wastes, spent nuclear fuel, nuclear materials, control and accounting for thereof, as well as information on other fuel cycle phases.

In accordance with the Atomic Act, ÚJD SR prepares "*Report on the status of nuclear safety of nuclear installations in the Slovak Republic and on the activities of ÚJD SR*" for the previous year, which is submitted to the Government and the National Council of SR. It also publishes an Annual

Report in the Slovak-English version, prepared *in electronic version and accessible to the public on the ÚJD SR website. Information on the publication of the current annual report is* distributed to ministries, other central state administration bodies, state organizations, higher territorial units and municipalities in localities with NIs, schools, embassies of foreign countries in the SR, Slovak embassies abroad, foreign regulatory authorities, international and other organizations.

ÚJD SR places great emphasis on communication with the public in the regions with NIs, striving for continuous improvement in a form of *close* cooperation with CIC Bohunice and Mochovce, representatives of municipalities, as well as by distribution of informative materials, such as leaflets and contributing to regional press and TV. *In cooperation with CIC, or municipalities, it organizes public meetings both in the field of nuclear safety, and in the field of radioactive waste management.*

ÚJD SR sends out annually to Slovak news agencies, dailies and e-media contributions on its domestic and foreign activities, *publishes press releases and the Chairperson of ÚJD SR provides interviews on current topics, such as the completion of MO34 NPP, etc. For many years, ÚJD SR has been together with the State Office for Nuclear Safety of the Czech Republic (SÚJB), later with Research Centre Řež, publishing the professional magazine "Nuclear Energy" (previously. "Nuclear Safety").*

In the area of emergency preparedness, *district* offices and municipalities, according to the Act No. 42/1994 Coll. on civil protection of the population, shall permanently publish information to the public on its website or on a public notice board, giving a period of 30 days for the public concerned to submit comments. Justified comments shall be reasonably taken into consideration in developing the public protection plan. Information is reassessed and updated, as needed; once updated, it is published as a minimum on a three-year basis. The public information includes in particular information about the source of threat, the possible scope of an emergency and the consequences in the territory and environment affected, hazardous properties and identification of substances and preparations which might give rise to an emergency, information on the method of public warning and rescue efforts, tasks and actions in an emergency, particulars of where further information relating to the public protection plan can be obtained. State administration authorities and selfgoverning bodies issue manuals for the public containing advice for the public which are aimed to furnish as much as possible information on how to act and behave in natural disasters, accidents and calamities. Since 1999, MV SR has issued the popular and educational periodical "Civilná ochrana, revue pre civilnú ochranu obyvateľstva" addressed to all who are actively involved in the performance of tasks under Act No. 42/1994 Coll. on public civil protection, but also to all readers interested in those issues.

The access to information is being limited with sensitive information as well as with the information that are subject to the Act No. 215/2004 Coll. on the Protection of Classified Information and on Amendments and Supplements to Certain Acts as amended. Act No. 215/2004 Coll. defines in Sec. 3, para 1 four categories of classified information – top secret, secret, confidential and reserved. Atomic Act in Sec 3, para. 16 defines the documentation that contains sensitive information as the documentation disclosure of which could be used to plan or carry out activities with the aim of

disrupting or destroying a nuclear installation, thereby adversely affecting public safety and causing environmental or economic damage. This documentation is made available after the exclusion of sensitive information. List of documentation containing sensitive information is specified in Annex 1 and 2 of Atomic Act.

8.1.(b) Information on incidents and accidents (Art. 8 (1b)

8.1.(b) I. Legal requirements for licence holders and regulatory authorities for making information on incidents and accidents available

The Atomic Act in Section 27, par. 4 (f) stipulates that the licence holder is obliged to immediately inform persons inside the NI about an incident or accident pursuant to par. 3 (b) or (c) of Section 27 of the Atomic Act, on measures for the protection of health, and on activities that must be performed when they occur. Atomic Act in Section 28, par. 22 stipulates that the licence holder and the district authorities in the seat of the region affected by the emergency response are obliged upon the occurrence of the event of an incident or accident inform the public without delay of the facts of the incident or accident ,of the steps to be taken and, if necessary, of the health protection measures to be taken by the public concerned.

The Atomic Act in Section 4, par. 1 (i) stipulates that the ÚJD SR shall immediately inform the general public about incidents and accidents of nuclear installations in Slovakia, as well as about accidents at nuclear installations outside the territory of the SR with possible impact on the territory of the SR. ÚJD SR further informs the public about incidents during transports of radioactive materials in the territory of Slovakia or outside the territory of the SR (with possible impact on the territory of Slovakia), on serious deficiencies in nuclear installations and measures taken to eliminate them, and other facts concerning nuclear safety of nuclear installations in Slovakia.

8.1.(b) II. Framework of communication policy on incidents and accidents to workers and public

Specified in par. 8.1.(a) I.

8.1.(b) III. Providing information in emergency situations

ÚJD SR Decree No. 55/2006 in Section 11 stipulates that licence holder shall provide information to the public and, according to Section 5 par. 3 (b) to (d) of the Atomic Act, also information to MV SR. The licence holder shall inform the public through public information contact and via the licence holder's website. The representative of the information contact point is as member of the organisation included in the emergency response organisation. The Decree further stipulates in Section 20 that in the case of an incident or accident during transport, the licence holder is obliged to report the incident or accident to the ÚJD SR immediately by phone and a written information about an incident or accident during transport no later than 45 minutes after its occurrence. The general public shall be informed within 30 minutes at the latest, if the incident or accident during transport has been rated INES 2 or higher.

8.1.(b) IV. Information provided to regulatory authorities of other member states

ÚJD SR ensures international cooperation including the fulfilment of obligations of the Slovak Republic arising from international treaties, as well as the execution of the contact point function, and fulfils other notification obligations towards IAEA and EU institutions.

8.2 Communication policy – information provided to the public (Art. 8 (2)

Atomic Act in Section 4, par. 1, (i) stipulates the obligation of ÚJD SR to inform the general public (specified in Chapter 8.1.(b) I.).

Further details are in Chapter 8.1.(a) II.

8.3 Cooperation with other regulatory authorities (Art. 8; 3)

8.3.1.I. Exchange of information with other regulatory authorities

Specified in Chapter 8.1.(b) IV.

8.4 Public participation in the decision-making process (Art. 8 (4)

8.4.1.I. Public participation in the decision-making process

Atomic Act in Section 8, par. 3 provides that a natural person or legal entity, whose status is derived from a special regulation, namely the Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters (Aarhus Convention), is also a party to the licensing procedure. Section 15 of the Administrative Procedure Code stipulates that a participant may act independently to the extent that he or she has the ability to acquire rights and assume obligations through his or her own actions.

The Environmental Impact Assessment Act in Section 24 defines the participation of the public and the public concerned in the proceedings. The competent authority shall immediately inform the public on its website, and where appropriate, also on its official notice board:

- a) That the proposed activity or its change is subject to a screening procedure, impact assessment, proceeding pursuant to Section 19, and the fact that the proposed activity or its change is subject to a transboundary impact assessment, if this is the case;
- b) Its power to take a decision on the proposed activity or its change in the screening procedure or in its impact assessment and on the licensing authority;
- c) that information can be obtained from the licensing authority and the competent authority on the proposed activity or its change, which is the subject of the proceedings;
- d) permits required for the implementation of the proposed activity or its change;

- e) expert opinion pursuant to Section 18 par. 1 (g), intention pursuant to Sections 22 and 23, the scope of the assessment pursuant to Section 30 and the assessment report on the activity pursuant to Section 31 of the Environmental Impact Assessment Act;
- f) the time, place and manner, in which the relevant information will be made available to the public, including information on the public hearing;
- g) details of the arrangements for public participation in the proceedings, including information on the licensing authority, to which comments or questions may be sent, and on the details of time limit for submitting comments or questions;
- h) practical information on access to administrative and judicial proceedings under the Environmental Impacts Assessment Act, in particular on public access to redress before an administrative authority and a court, and to determine the stage of proceedings, at which decisions, acts or omissions may be challenged;
- i) other information relevant for the final opinion or permit.

The public concerned shall have the status of a party in the proceedings referred to in Part Three, and consequently the status of a party in the licensing procedure for the proposed activity or its change, if applying the procedure under par. 3 or par. 4 of Section 24 of the Environmental Impact Assessment Act, if its participation in the proceedings no longer follows from a special regulation. The right of the public concerned to a favourable environment, which has expressed an interest in the proposed activity or its change in accordance with par. 3 or par. 4, may be directly affected by the authorization of the proposed activity or its change or the subsequent implementation of the proposed activity or its change.

The public may express an interest in the proposed activity or its change, and in the proceedings for its authorization by filing

- a) of a reasoned opinion on the intent pursuant to Section 23 par. 4;
- b) substantiated comments on the scope of assessment of the proposed activity or its change pursuant to Section 30 par. 6;
- c) a reasoned opinion on the assessment report pursuant to Section 35 par. 2;
- d) a reasoned opinion on the notification of the change pursuant to Section 29 par. 9.

The public has the right to appeal against a decision on whether the proposed activity or its change is to be assessed under this Act (decision issued in the screening procedure), or against the final opinion even if it was not a party to the screening procedure or a procedure for final opinion or its changes. The date of delivery of the decision when filing such appeal is the fifteenth day of publication of the decision issued in the screening procedure pursuant to Section 29 par. 15 or the final opinion of the competent authority pursuant to Section 37 par. 7. By lodging an appeal, the public expresses an interest in the proposed activity and in the procedure for its authorization.

8.4.1.II. Examples of public participation

A practical example of the possibility of public participation in the decision-making process is for example, the possibility for the public to comment on the decision of commissioning of MO34. For example, the draft decision on the commissioning was on the ÚJD SR's web page and possibility was given to submit comments to ÚJD SR within two months period.

8(a) Nuclear safety objective for nuclear installations (Art. (8a)

Article 8(a)

- 1. Member States shall ensure that the national nuclear safety framework requires that nuclear installations are designed, sited, constructed, commissioned, operated and decommissioned with the objective of preventing accidents and, should an accident occur, mitigating its consequences and avoiding:
 - a) early radioactive releases that would require off-site emergency measures but with insufficient time to implement them;
 - *b)* large radioactive releases that would require protective measures that could not be limited in area or time.
- 2. Member States shall ensure that the national framework requires that the objective set out in paragraph 1:
 - a) applies to nuclear installations for which a construction licence is granted for the first time after 14 August 2014;
 - b) is used as a reference for the timely implementation of reasonably practicable safety improvements to existing nuclear installations, including in the framework of the periodic safety reviews as defined in Article 8c(b).

8(a) 1.I. Overview of legislation for the individual stages of life of nuclear installation with the objective of preventing accidents

The Directive No. 2014/87/Euratom has been transposed into national law, in particular by Act No. 96/2017 Coll., amending and supplementing Act No. 541/2004 Coll. (Atomic Act) which entered into force on 1 August 2017.

The legislation requires the licence holder (Decree No. 431/2011 on the quality management system as amended, Annex 6 – Requirements for the quality of nuclear installations) to define safety objectives. Based on this requirement, the following quantitative safety objectives are defined: radiation criteria, probabilistic safety objectives, probabilistic safety criteria and their relation to internationally accepted standards.

The safety objectives proposed by the licence holder are subject to approval by ÚJD SR.

Probabilistic safety objectives and criteria are contained in ÚJD SR safety guide BNS I. 4.2/2017 in accordance with relevant IAEA and OECD/NEA documents. The licence holder may set more stringent targets in its quality management documents, than these values.

Radiation criteria are contained in Act No. 87/2018 Coll. on radiation protection and on amendments to certain laws and in ÚJD SR Guide BN 5/2019 on Requirements for Deterministic Safety Analyses of NPPs with VVER-440/V213.

During operation and during decommissioning of a nuclear installation, under the Atomic Act, Section 23 par. 2 (f), the licence holder is obliged to regularly assess, verify, and where reasonably practicable, continuously and systematically increase the level of nuclear safety of nuclear installations in a verifiable manner, and conduct periodical, comprehensive and systematic nuclear safety reviews of nuclear installations at least every ten years, taking into account the current state of knowledge in the field of nuclear safety assessment, and taking measures to eliminate identified deficiencies, and to eliminate their recurrence in the future; this includes verifying that measures are in place to prevent accidents and mitigate their consequences, including verification of the application of defence-in-depth principles.

Emergency procedures and measures are specified in 6.1.(e) I.

8(a) 1.II. Overview of legislation mitigating the consequences in case of an accident

Specified in Chapter 8(a) 1.I.

The Atomic Act in Section 23a par. 8 stipulates that NI must be designed, sited, constructed, commissioned, operated and decommissioned in such a way as to prevent accidents and mitigate their consequences, if they occur, as well as to prevent early radioactive releases that would require off-site emergency measures, while there is insufficient time for their implementation, and large radioactive releases that would require protective measures that could not be limited in area or time.

For operational events at a nuclear installation and events during transports of radioactive materials, the Atomic Act in Section 27 par. 4 obliges the licence holder to:

a) develop binding procedures for dealing with events;

b) take preventive and precautionary measures in a timely manner and to eliminate, without undue delay, any conditions that could endanger nuclear safety, life or human health;

c) report to ÚJD SR deficiencies identified during operation, maintenance or control that could lead to incidents. Pursuant to the Atomic Act (§ 28 par. 5), the licence holder is obliged to take preventive measures, as well as measures to overcome or mitigate the consequences of incidents or accidents of a nuclear installation or during transports of radioactive materials. The licence holder is obliged to inform the public about the measures and procedures.

Requirements for nuclear safety of NIs, pursuant to ÚJD SR Decree No. 430/2011, must be met during the stages of their siting, design, construction, commissioning, operation, decommissioning,

and for closure of a repository. Annex 3 (Part B. I, section C par. 2) of the decree stipulates that the design of a nuclear installation provides for defence-in-depth:

a) apply a conservative approach to ensure nuclear safety in order to limit the occurrence of operational events;

b) address multiple physical barriers against the release of radioactive substances into the working environment and the environment;

c) provide multiple means to fulfil safety functions, both by ensuring the effectiveness of physical barriers and by mitigating consequences of their breach;

d) include, in addition to internal safety characteristics also a proposal of reliable technical means to ensure safety,

e) contain preventive measures against occurrence of operational events, to cope with them and to mitigate their consequences by means of systems, structures and components, as well as operating procedures.

The design shall include technical measures and procedures to control and mitigate possible radiological consequences. It must ensure that operating conditions that may result in high radiation doses or release of radioactive substances, have a very low frequency and operating conditions with a significant frequency have only negligible or no potential radiological consequences (ÚJD SR Decree No. 430/2011, Annex 3 Part B. I, Section G par. 3 and 4). The design must also include analyses to verify the behaviour of NIs in the event of accidents under the conditions of extended design, to minimize releases of radioactive substances harmful for the population and the environment as far as reasonably practicable (ÚJD SR Decree No. 430/2011, Annex 3 Part B. II, Section E par. 9).

NI shall be equipped with a containment system which, in the event of postulated initiating events associated with the release of radioactive substances and ionizing radiation into the environment, limits these releases so that they are lower than the established limits for releases, unless this function is provided by other means. The containment system shall be designed in such a way that its required tightness is maintained during design-basis accidents. According to ÚJD SR Decree No. 430/2011, Annex 3 Part B. II Section D par. 1 and 2, the following requirements also apply for the containment:

- The pressure and temperature inside the containment shall be controlled during accident under the conditions of extended design.
- The concentration of flammable gases shall be controlled during accident under the conditions of extended design.
- The containment shall be protected against internal overpressure during accident in Design Extension Conditions (DEC).
- High pressure core melt scenarios shall be prevented.

- Containment degradation by molten fuel shall be prevented as far as reasonably practicable.

The general radiation criteria for taking protective measures in case of an incident or accident are defined in Annex No. 12, part 2 of Act No. 87/2018 Coll. on radiation protection. Annex no. 4 of Ministry of Health Decree 99/2018 Coll. on the provision of radiation protection defines operational intervention levels for the adoption of protective measures. All radiation criteria for the adoption of protective measures, are based on IAEA safety standards, primarily Appendix 2, tables II.2 and II.3 GSR Part 7 and EPR NPP OIL: Operational Intervention Levels for Reactor Emergencies and Methodology for their Derivation.

8(a) 2. Nuclear installations with permit for construction after 2014 and safety improvements at existing nuclear installations

8(a) 2.a.l. Building permit after 2014

After 14 August 2014, one building permit was issued for the Integral RAW storage facility in Bohunice (IS RAO).

8(a) 2.a.II. Description of regulatory requirements for permits after 2014

The European Commission (according to Article 37 of the Euratom Treaty) stated that the construction of IS RAO did not require a modification of the existing permit for the discharge of radioactive waste (issued by ÚVZ SR 21 October 2011 under No. OOZPŽ/7199/201); permit applicable to facilities operated by JAVYS, a. s. at Bohunice site. This construction did not increase the potential radiological consequences of unplanned releases that could occur in a reference accident at the Bohunice site as a whole.

8(a) 2.a.III Specific cases of practical implementation

More information about IS RAO is in Chapter 3.7.

8(a) 2.b.I Implementation of the Article through regulatory requirements and practices

Comprehensive and systemic safety reviews are to be carried out periodically for the existing installations throughout their life cycle to determine safety improvements that are oriented to meet the above objective.

Pursuant to the Atomic Act and ÚJD SR Decree No. 33/2012 Coll. on the regular, comprehensive and systematic assessment of nuclear safety of nuclear installations, the licence holder is obliged to conduct regular, comprehensive and systematic nuclear safety review, taking into account the current state of knowledge in the field of nuclear safety and adopt measures to eliminate identified deficiencies and to eliminate their recurrence in the future.

8a) 2.b.II. Examples of implementation of reasonably practicable measures

Details of practical application of this provision are given in Chapters dealing with the periodic nuclear safety review, i.e. 3.3.-3.8. and 6.1.(c) IV.

8(b) Implementation of nuclear safety objective of nuclear installations (Art. 8b)

Article 8(b)

- 1. In order to achieve the nuclear safety objective set out in Article 8a, Member States shall ensure that the national framework requires that where defence-in-depth applies, it shall be applied to ensure that:
 - a) the impact of extreme external natural and unintended man-made hazards is minimised

b) abnormal operation and failures are prevented;

c) abnormal operation is controlled and failures are detected;

d) accidents within the design basis are controlled;

e) severe conditions are controlled, including prevention of accidents progression and mitigation of the consequences of severe accidents;

f) organisational structures according to Article 8d(1) are in place.

- 2. In order to achieve the nuclear safety objective set out in Article 8a, Member States shall ensure that the national framework requires that the competent regulatory authority and the licence holder take measures to promote and enhance an effective nuclear safety culture. Those measures include in particular:
 - a) management systems which give due priority to nuclear safety and promote, at all levels of staff and management, the ability to question the effective delivery of relevant safety principles and practices, and to report in a timely manner on safety issues, in accordance with Article 6(d);
 - *b)* arrangements by the licence holder to register, evaluate and document internal and external safety significant operating experience;
 - *c)* the obligation of the licence holder to report events with a potential impact on nuclear safety to the competent regulatory authority; and,
 - d) arrangements for education and training, in accordance with Article 7.

8(b) 1. Defence-in-depth (Art. 8b; 1)

8(b) 1.I. Overview of national requirements

The Atomic Act in Section 23a par. 6, 10, 11 defines the concept of defence-in-depth. Defence-indepth is a hierarchical system of several levels of different technical means and organizational measures aimed at preventing the progression of operational events, and maintaining the effectiveness of physical barriers located between nuclear materials, spent nuclear fuel or radioactive waste, and the employees, general public and environment during operational conditions, and certain barriers even during emergencies. The concept shall be applied in the design and in all stages of existence of NI.

Defence-in-depth is used for:

a) minimizing the impact of extraordinary external natural hazards and unintended threats due to human activity,

b) preventing abnormal operation and failures,

c) controlling abnormal operation and faults detection,

d) managing design-basis accidents,

e) managing accidents in serious conditions, including the prevention of progression of accidents and mitigation of consequences of severe accidents,

f) introduction of organizational structures for emergency preparedness and emergency response pursuant to Section 28 par. 7.

8(b) 1.II. Requirements for further measures to mitigate accidents

As described in Chapter 8(a) 1.II., Annex 3 Part B II Section E of ÚJD SR Decree No. 430/2011 stipulates that based on operational experience, relevant safety analysis and research results, the design shall also focus on Design Extension Conditions with fuel melting, while taking into account the following (e.g.):

- a) the possibility of multiple failures of safety systems with consequent threats to the integrity of physical barriers against the release of radioactive substances; preventive or mitigation measures should not apply conservative approach,
- b) the possibility of using certain safety systems, as well as systems not directly related to nuclear safety, or additional temporary systems to perform other than originally considered functions, and under other than anticipated operating conditions to bring the NI into controlled condition or to mitigate the consequences of selected events under point b),
- *c)* for multi-unit NPPs, the use of available means of support from other units provided that the safe operation of these units is not endangered.

8(b) 1.III. Examples of practical implementation

ÚJD SR **BN 5/2019** Safety Guide on requirements for deterministic safety analyses in section 6.3 stipulates that attention should be paid to auxiliary and support systems (e.g. ventilation, cooling, power supply) when identifying conditions of extended design without significant degradation of nuclear fuel, since some of these auxiliary /support systems may cause immediate or delayed subsequent multiple failures of operational and safety systems.

Annex 1 of BN 5/2019 includes the categorization of all initiating events for the purposes of deterministic safety analyses and their evaluation.

Events in the category of DEC are more serious than design-basis events or events with multiple failure (of equipment, operator, safety systems), not contemplated in the design of NI. Radioactive releases into the environment should be minimized, and as low as reasonably practicable/achievable, and early releases or large releases should be practically eliminated.

Accidents (severe accidents) have an extremely low incidence. They are caused by extreme conditions or by multiple failures. Fuel damage and radiological consequences for the population (in the emergency planning zone, or even beyond the emergency planning zone, depending on the specific situation) may require the application of protective measures to mitigate the radiological consequences. For new NIs, events with core melting (which could lead to early radioactive releases or large radioactive releases off-site) shall be practically eliminated.

Severe Accident Management Guidelines

This subject is discussed in more detail in Chapter 6.1.(e) IV.

Capability to manage severe accident in case of simultaneous core melt/fuel damage in different units of the same site (multi-unit events)

This subject is discussed in more detail in Chapter 6.1.(e) IV.

8(b) 2. Implementation of the nuclear safety objective for nuclear installations (Art.8b (2)

8(b) 2.1. Regulatory framework for nuclear safety culture

Safety culture is defined in Section 2 (y) of the Atomic Act as attitudes and principles of conduct of the licence holder and its staff, approved by the statutory body and understood and supported by employees to ensure priority is given to nuclear safety over other matters.

Atomic Act in Section 23, par. 2 (e) stipulates that the licence holder has to pay priority to the safety aspects over all other aspects of the authorized activity. Licence holder is also, in accordance with Section 23, par. 2 (u) of Atomic Act, obliged to acquaint its contractors and subcontractors, whose activities may affect nuclear safety, with the safety culture requirements and to control their fulfilment.

ÚJD SR Decree No. 431/2011 on the quality management system in Section 3 stipulates the obligation for licence holder to apply the Quality Management System using graded approach at all levels and allocating the necessary resources. The licence holder shall implement a process approach within the Quality Management System with the emphasis on those processes that may affect safety and are measurable or evaluable for processes and safety culture assessment.

The Quality Management System shall also include provisions for an adequate level of safety culture.

8(b) 2.II. Practical examples of implementation at all levels

According to the process model of SE, a.s., safety culture improvement is part of a process of continuous improvement. Responsibilities and procedures for improving safety culture are described in detail in relevant internal documents. Action Plan for improving safety culture is one of the means for monitoring and evaluating safety culture. The Action Plan is a set of measures that result from periodical safety culture assessments (e.g. safety culture assessments, safety culture surveys conducted every two years, staff interviews, event analyses, independent reviews, such as peer review missions by WANO, or IAEA, OSART missions, etc.). Based on the findings from assessments, which identify weaknesses of the safety culture, corrective actions are proposed in the form of a task with a deadline and clear responsibilities. Measures may include, for example, a workshop focusing on the relevant attribute of safety culture, training in safety culture focusing on a specific group of staff, benchmarking activities, changes in the process of safety culture improvements, etc.

Action Plans are approved by Plant managers. Action Plans are evaluated on an annual basis and the results are presented at the meeting of plant managers. A set of safety culture indicators is used to monitor and evaluate the process of safety culture improvements. The indicators are evaluated on a quarterly basis, and are related to the relevant safety culture attributes (WANO PL 2013-1 Signs of a healthy nuclear safety culture). Examples of currently valid indicators are: number of employees awarded for exemplary safety behaviour, implementation of a conservative approach to the work management process, duration of cause analysis of selected events, etc.

The principles of safety culture are also applied at JAVYS, a. s. The promotion and continuous safety culture improvement is addressed in the relevant internal documents, such as, for example, IMS Policy and Safety Policy, Safety Culture Directive.

8(b) 2.a. Integrated Management System

8(b) 2.a.I. Requirements for IMS implementation from licence holders

The topic is specified in more detail in Chapter 6.1.(d) on Integrated Management System.

Inspection activity of the regulatory authority, including topics of IMS, is specified in Chapter 5.3.(c) II.

The management system of ÚJD SR follows the quality assurance system, which was built and used mainly on the basis of STN ISO 9001 from 1 January 2002. The quality management system of ÚJD SR is further developing at ÚJD SR according to STN ISO 9001, STN EN ISO 9004 and in connection with applicable requirements of the IAEA document (Leadership and Management for Safety, General Safety Requirements, Safety Standards Series No. GSR Part 2). The latest assessment of the management system of ÚJD SR was performed in 2019.

8(b) 2.a.II. Requirements for recording operational events

Definition of operational events, their categorization (failures, incidents, accidents), the requirements for their resolution and reporting are defined in Section 27 of the Atomic Act. More details regarding the method and the scope of notification of operational events are in ÚJD SR Decree No. 48/2006, laying down details on the method of reporting operational events and events during transport and details of investigation of their reasons.

Legislative requirements are further reflected in the licence holder's internal documents laying down the procedures and responsibilities for reporting and management of occurrences.

Definition and Classification of Operational Events at Nuclear Installations

Operational events at a nuclear installation and events during transport of radioactive materials are defined under Sec. 27 of the Atomic Act as follows:

1. An operational event is an event in which a threat to, or a violation of, nuclear safety occurred at a nuclear installation during commissioning, operation, decommissioning thereof or during the closure of repository.

2. An event during transport is an event during transport of radioactive materials which caused noncompliance with the requirements for safety in transport of radioactive materials.

- 3. Operational events and events during transport are divided into:
 - a) a failure which
 - jeopardized nuclear safety without a direct threat to the performance of safety functions,
 - disrupted safety barriers or other safety measures without direct consequences,
 - gave rise to the lapse of limits and conditions of safe operation and safe decommissioning,
 - caused the violation of limits and conditions without direct consequences on the performance on safety functions,
 - triggered safety systems or triggered them due to real reasons, but without direct consequences,
 - caused a violation of technical conditions or transport regulations in transport without direct consequences,
 - caused other disruption of equipment reliability requiring corrective action to eliminate consequences,
 - caused a release of radioactive substances or ionizing radiation in which exposure limits are not exceeded,
 - b) an incident which caused
 - threat to, or disruption of, the performance of safety functions,

- failure of safety systems or trigger of safety systems for actual reasons which require action to eliminate consequences,
- serious disruption or failure of safety barriers,
- release of radioactive substances or ionizing radiation with exposure limits exceeded,
- c) an accident which caused a release of radioactive substances which requires actions to protect the public.

8(b) 2.b. Documenting and analysing operational events (OE) at nuclear installations

Pursuant to Section 27 par. 4 of the Atomic Act, the licence holder is obliged to report to ÚJD SR deficiencies identified during operation, maintenance or inspections, which could lead to events according to par. 3 of this section, and if these are operational events of categories incident or accident, then also to Ministry of Interior of the Slovak Republic and Ministry of Health of the Slovak Republic, to determine their causes, adopt all appropriate measures to mitigate their consequences and implement corrective actions; the licence holder is obliged to report any incident or accident during transport also to the Ministry of Transport of SR. Based on the results of analyses of the causes of operational events and events during transport of radioactive materials, the licence holder is obliged to formulate conclusions, consider best practices in the given field, and take corrective actions without undue delay in order to prevent recurrence of event and development of conditions lowering nuclear safety; the licence holder is obliged to demonstrably instruct his employees about the results of analyses and corrective actions.

The aim of investigation of operational events is not to identify the culprit but to find out WHAT has happened, HOW and WHY it has happened in order to define necessary corrective action to prevent recurrence of such events or mitigate their consequences.

Root cause analysis is performed by a team led by analysts. The TapRooT methodology has been used for investigating the causes (since 2009), or HPES (Human Performance Enhancement System developed by INPO).

From 2010 all non-compliance cases (from minor non-compliance up to failures) are recorded, evaluated, managed under SAP NUCLEAR.

Precursors of operational events - low level events (so-called recorded events) or near misses that do not meet the notification criteria pursuant to Atomic Act are analysed in a similar way, with the scope of analysis to be determined by a potential risk of the precursor and frequency of its occurrence. Corrective action is taken based on the results of precursor analyses. Based on its internal criteria, the licence holder analyses a much higher number of issues and events than those reported to ÚJD SR.

The licence holder carries out periodic analyses of trends of operational events and their precursors. In case that an unfavourable trend is identified in any area, an analysis of causes is performed. The licence holder takes corrective action based on the above analyses.

Extraordinary Failure Commission

The Extraordinary Failure Commission (hereinafter only as "EFC") is convened as soon as information is obtained from the Plant Shift Supervisor about the occurrence of an operational event meeting the criteria to convene EFC under the appropriate directive. The role of EFC is to identify the direct cause of the event, define immediate corrective action and set forth action for further operation of the unit.

Minutes of the EFC convened with a view to immediately discussing the occurred operational event is submitted to ÚJD SR. Minutes of the EFC is a preliminary report on the operational event. The final analysis, including the root cause analysis, shall be prepared by the team in charge of investigation into the event as a standard report of an expert group.

Evaluation of Effectiveness of Corrective Actions Taken

Evaluation of the effectiveness of implemented corrective actions is done using several procedures:

- Evaluation of effectiveness of corrective actions to prevent recurrence of a specific event this evaluation is performed by a person, who was not involved in the process of analysing the event, approx. 6 to 12 months after implementing the last corrective action. The result of the evaluation is discussed again at the Committee for correction and prevention system (VSNaP) and if necessary, new corrective actions are taken regarding the given event.
- A continuous evaluation of indicators set for the process of the Correction and Prevention System (SNaP) in the report from Continuous self-assessments.
- In the system of operational safety indicators (SPUB) there are selected indicators of operational events that are evaluated quarterly and annually. Results of evaluation of trends of identified indicators are elaborated in the report on the status of safety, on the basis of which corrective actions are also taken.
- In the Annual Report on the feedback from internal events statistical evaluation of operational events and their precursors in order to identify areas for improvement based on negative trends of feedback indicators (e. g. the trend of event recurrence). The Annual Report is discussed in the Nuclear Safety Committee, which based on identified areas for improvement takes decisions on the relevant corrective actions.

Precursors of Operational Events – Events without Consequences

In order to prevent serious events and as a measure to improve safety culture, the licence holder put in place an operational event precursors management system. Precursors are low level events and near misses. Definitions:

a) Low level events (so-called registered events) – are defined as events (undesirable deviations) with minimum consequences, not falling under Atomic Act

b) Near misses – are such precursors for which a deviation was prevented from developing into a potentially safety-relevant event with an adverse consequence.

The aim of reporting and analysing low level events and near misses is to maintain awareness of risk of potential operational events. Using this vehicle, the licence holder proactively manages known internal factors related to the project, equipment, training, maintenance, regulations, communication, goals, etc., which are present in the activity performance and assessed as hazardous.

Providing feedback including occurrences at nuclear installations of other nuclear power plants abroad

Feedback

The licence holder uses international informative systems on operational experience from nuclear energy (WANO and the IAEA) to apply measures from analyses of events of other NI for its own unit and also to pass his own experience to other licence holders. The aim of this activity is to eliminate repetition of the same or similar events by implementation of preventive measures.

The procedure of processing and using information about events at other NI is described in detail in the relevant internal documents of the licence holder.

8(b) 2.c. Obligation of the licence holder to report events

8(b) 2.c.l. Notification of a NI Operational Event to the Regulatory Authority

The licence holder notifies ÚJD SR on the operational event in the category failure as per Decree No. 48/2006 Coll. by making written reports for the appropriate calendar month by the 20th day of the following calendar month.

The licence holder is obliged to deliver UJD SR the original information on the operational event, in the category an incident or accident in writing within 45 minutes from its identification by fax, e-mail or in person according to the time of incident or accident occurrence so that the information is demonstrably reported to the UJD SR. Also part of the information is a preliminary assessment according to the INES. Final report on the incident or accident is submitted by the licence holder to UJD SR as a summary for the relevant calendar month by the 20th day of the following calendar month.

Notification of an Incident or Accident during Transport

Pursuant to Section 20 of ÚJD SR Decree No. 55/2006, the licence holder forthwith notifies ÚJD SR of the occurrence of an incident or accident during transport.

Written information on an incident or accident during transport in the form as required under emergency transport rules, shall be delivered by the licence holder no later than 45 minutes from its identification by fax, electronically or in person depending on the time when the event occurred to ÚJD SR, as well as to Ministry of Transport and Construction of the Slovak Republic.

The authorization holder notifies the public within 30 minutes, if an incident or accident during transport was assessed according to the INES with level 2 or higher, in accordance with the requirements under special regulations. *The licence holder shall immediately inform the public about an incident or accident during transport by information about the event by means of mass communication.*

8(b) 2.d. Arrangements for education and training

Topic is specified in Chapter 7.

8(c) Initial assessment and periodic safety reviews (Art. 8c)

Article 8c

Member States shall ensure that the national framework requires that:

- any grant of a licence to construct a nuclear installation or operate a nuclear installation, is based upon an appropriate site and installation-specific assessment, comprising a nuclear safety demonstration with respect to the national nuclear safety requirements based on the objective set in Article 8a;
- b) the licence holder under the regulatory control of the competent regulatory authority, reassesses systematically and regularly, at least every 10 years, the safety of the nuclear installation as laid down in Article 6(c). That safety reassessment aims at ensuring compliance with the current design basis and identifies further safety improvements by taking into account ageing issues, operational experience, most recent research results and developments in international standards, using as a reference the objective set in Article 8a.

8(c) 1.1. Siting (Art. 8c; a)

8(c) 1.1.I. Legislation in the field of Siting

Requirements and obligations for siting a nuclear installation and site selection are specified in the Atomic Act and in ÚJD SR Decree No. 430/2011. In Annex 2 of the Decree, there are characteristics of an area that exclude its use for siting of nuclear installations. The evaluation of seismic risks is based on the relevant IAEA documents, which are also reflected in the safety guides issued by the ÚJD SR (such as Simple Failure Criterion, BN 2/2019, ÚJD SR, Bratislava, 2019; Requirements for chapter 16 of the Pre-Operational Safety Report – Limits and Conditions (hereinafter only as "L&C"), BNS I.2.5/2005, ÚJD SR, Bratislava, 2005).

Pursuant to Section 17 of the Atomic Act, ÚJD SR decides on the issuance of consent for siting of a NI based on written application supported by the documentation specified in Annex 1, par. A of the Atomic Act. Details of the scope, content and method of preparation of the documentation specified in Annex 1 par. A, are established by a generally binding legal regulation, issued by ÚJD

SR (e. g. ÚJD SR Decree 430/2011 Coll.). The final decision on the siting of a NI is issued by the relevant district authority.

After 14 August 2014, one consent was issued for construction of NI - as specified in 8(a) 2.a.l.

8(c) 1.2. Design and construction (Art. 8c; a)

The Atomic Act in Section 23a par. 8 stipulates that NI shall be designed, sited, constructed, commissioned, operated and decommissioned in such a way as to prevent accidents and mitigate their consequences, if they occur, as well as to prevent early radioactive releases, that would require off-site emergency measures, while there is insufficient time for their implementation, and large radioactive releases, which would require protective measures that coult not be limited in area or time. For existing nuclear installations, for which a building permit was issued before 14 August 2014, the requirements of Sec. 23a, par. 8 shall apply as a target for timely implementation of reasonably practicable. The provision of par. 8 thus, for the time being, constitutes the only legislative requirement, which is specific to new NIs. All other legislative requirements related to the conditions for the peaceful uses of nuclear energy in NIs, apply without distinction to existing NIs, as well as any new NIs. Therefore, for the new NIs, all the requirements already mentioned in the previous sections of this Report (Chapters 8(a) to 8(c) apply.

As an implementing regulation to the Atomic Act, ÚJD SR issued its Decree No. 430/2011 specifying the details for siting, design, construction, commissioning, operation and decommissioning of NIs, and for the closure of a repository.

The design of the reactor core and related protection systems shall ensure that limit parameters of fuel assemblies during normal and abnormal operation are not be exceeded. In case of emergency conditions, the limit failure of the fuel assemblies shall not be exceeded; it is necessary to ensure that limit parameters of fuel assemblies, which serve as the basis for design of other equipment, are not exceeded during normal operation, abnormal operation and design accidents.

Control systems shall be equipped so as to monitor, measure, register, and manage systems of relevance to nuclear safety.

Protection systems shall be capable of automatically starting up reactor protection systems, with operating personnel having the possibility of starting up these systems manually. Protection systems shall be backed up and allow for functionality testing.

The primary circuit design principles require that sufficient strength be provided under normal and abnormal operation so as to prevent a loss of coolant and allow throughout the whole operation for periodic or continuous monitoring for the primary circuit condition and testing necessary to verify the nuclear safety.

A NI shall be equipped with a confinement to restrict, under emergency conditions involving a leakage of radioactive substances, such leaks into the environment so as to keep them below the limit values, unless the function is provided other technical facilities.

Building structures, technological systems and components of relevance to nuclear safety of the NI shall be designed, manufactured, assembled, and tested so as to ensure their reliable function. The investor – the holder of an authorization to construct a NI under Art. 5 (3) of the Atomic Act – shall ensure that the manufacturers and suppliers of classified equipment (equipment of relevance to nuclear safety), materials and accessories thereof are obliged to set out in the supply quality documentation the results of selected quality production checks and tests of properties of components, equipment, base material, welded joints and weld deposits, material properties and composition as well as indications and removed material defects detected by an inspection (ÚJD SR Decree No. 431/2011 Coll.) (e. g. keeping evidence samples).

Control systems shall allow for monitoring, measurement, registration, and management of values and systems of relevance to nuclear safety. Devices and actuators shall be designed and arranged so that maintenance personnel constantly have sufficient information on operation of the nuclear installation (ÚJD SR Decree No. 430/2011 Coll.). The control room shall allow for safe and reliable operation control.

The construction of nuclear installations is governed by Act No. 50/1976 Coll. (Building Act) and implementing regulations thereof, the approved Framework Quality Assurance Programme for a given nuclear installation, its Stage Quality Assurance Programme for construction and the quality assurance requirements referred to in quality plans of classified equipment during their assembly and post-assembly testing.

8(c) 1.3. Initial assessment (Art. 8c (a)

The same assessment and/or evaluation procedures would be applied when assessing new NIs in the individual stages of their life cycle, for the details, see the licensing procedure in Chapter 8(c) and 4.1.(c).

8(c) 2.1. Safety review of a nuclear installation (Art 8c (b)

8(c) 2.1.I. National framework's requirements for periodic safety reviews

Atomic Act in Section 23, par. 2 (f-g) stipulates the obligation of the licence holder during operation and during decommissioning of NI to periodically assess, verify, and if reasonably practicable, continuously enhance nuclear safety in a systematic and verifiable manner, and perform periodic, comprehensive and systematic nuclear safety reviews of nuclear installations at least every ten years, taking into account the current state of knowledge in the field of nuclear safety, and take measures to eliminate identified deficiencies, and to eliminate their recurrence in the future; this also includes verifying that measures are in place to prevent accidents and mitigate their consequences, including verification of the application of defence-in-depth principles. The licence holder is obliged to assess nuclear safety at the intervals and to the extent stipulated by a generally binding legal regulation (ÚJD SR Decree No. 33/2012 Coll, while applying as reference target as stipulated by Section 23a par. 8 of the Atomic Act. The intervals and the scope of periodic, comprehensive and systematic nuclear safety review of nuclear installations (PSR) are regulated by **ÚJD SR Decree 33/2012**. The licence holder shall perform the first periodic review of the current state of NI as at the date, on which eight years have elapsed from the entry into force of the license for operation of NI without any time limit. Each subsequent periodic review shall be performed by the licence holder according to the current state of NI as at the date on which ten years have elapsed from the date, on which the previous periodic assessment was performed.

Periodic assessment including objectives and elements of individual areas according to par. 5 of Section 2 of the Decree 33/2012 focuses on comparing the achieved state of nuclear safety at NI with the current nuclear safety requirements and the best practice, evaluation of cumulative effects of ageing of NI, impact of implemented and considered changes on NIs, operational experience and technical development in nuclear safety, identifying justified modifications to a nuclear installation with the aim to maintain required high level of nuclear safety or to enhance it, while demonstrating that the required level of nuclear safety is ensured until the next periodic review.

Areas of periodic review include:

- design of NI,
- current state of NI,
- equipment qualification,
- ageing management,
- deterministic safety analyses,
- probabilistic safety assessments,
- unintentional internal threat and unintended external threats to NI,
- operational safety of NIs,
- use of experience from other NIs and research results,
- organization, administration, safety culture and quality management system,
- operational procedures,
- human factor,
- emergency planning,
- radiological impact on the environment.

The licence holder submits a periodic review report to ÚJD SR within 12 months from the date, on which periodic assessment was performed. The report on periodic review contains a brief description of the periodic review, stating its objective, scope, procedure, sources used and a summary of references to the most important documentation used and prepared, results of nuclear safety assessment in individual areas pursuant to par. 5 of Section 2 of Decree 33/2012,

summary of results of the overall safety assessment of NI, the integrated plan for implementation of proposed corrective actions and safety improvements to eliminate the deviations found, and the final assessment.

During the decommissioning of NI, the licence holder shall perform periodic assessment at the end of each decommissioning stage.

BN 1/2020

ÚJD SR Safety Guide BN 1/2020 specifies the ÚJD SR requirements for a comprehensive PSR, which are laid down in Decree 33/2012. The Guide also follows up on other decrees and ÚJD SR safety guidelines. It provides guidelines and recommendations for the PSR of NI during operation and decommissioning stages with the aim to assess all aspects of the technical condition and operation of NI. The areas under assessment include: design of NI, current state of NI, equipment qualification, ageing management, deterministic safety analyses, probabilistic safety assessment, unintentional internal and external threats to NI, operational safety of NI, use of experience from other NIs and research results, organization, administration, safety culture and quality management system, operating procedures, human factor, emergency planning, radiological impact on the environment and long-term safe operation of NI. For each of these areas, the objective of the review, description of the area under review, the related desirable state and those aspects that need to be checked.

The Guide was prepared on the basis of IAEA document: "Periodic Safety Review for Nuclear Power Plants", included in the hierarchy of IAEA documents among safety standards, as well as WENRA RHWG requirements, a working group for harmonization of nuclear safety requirements, item P. It is intended for holders of operating license or for decommissioning of Nis.

BN 1/2020 was developed mainly for nuclear power plants, but it is adequately usable also for other NIs that are operated or decommissioned. The Safety Guidelines are not legally binding, but help to reach compliance with legally binding documents. The Guide is a revised and supplemented 3rd edition of the previous ÚJD SR Safety Guide, BNS I.7.4/2016 Comprehensive PSR 2nd edition. The Guide was issued without a time limit.

8(c) 2.1.II. Role of regulatory authorities in periodic safety reviews

Within its scope of powers defined by Atomic Act, ÚJD SR systematically assesses nuclear safety of NIs, reviews the safety documentation and performs both scheduled and unplanned inspections. Scheduled inspections are based on a three-year inspection plan and are specified in a one-year inspection plan. Reviews and inspections cover the entire life cycle of NI, as well as activities including periodic assessment, its individual areas, state and activities performed. Review of assessment represents a long-term process for ÚJD SR, which goes beyond the time frame of periodic assessment. The review of periodic assessment uses knowledge of the achieved level of nuclear safety of a nuclear installation, as well as the results of reviews and inspections performed during periodic review, also in the past period, not only by the regulatory authority, but also by external experts.

ÚJD SR report on the PSR documents the results of verification of the PSR performed by the licence holder. ÚJD SR reviewed the submitted documentation and the results of periodic assessment including the integrated plan for the implementation of proposed corrective actions and safety improvements to eliminate the identified negative facts. Verification was performed as part of the ÚJD SR inspection No. 306/2018.

The verification was performed by ÚJD SR inspectors, as well as contracted independent external experts. The ÚVZ SR also provided partial opinions and supporting documentation for the review report. The review was conducted with regard to the provisions of the Atomic Act, the Decree No. 33/2012 as amended by Decree No.106/2016, as well as provisions of other laws and decrees applicable in the SR, WENRA reference levels, IAEA safety standards, ÚJD SR safety guidelines, etc. The review followed the procedures of the management system of ÚJD SR for the assessment of documentation and the performance of inspections.

8(c) 2.1.III. Dates of the most recent periodic safety reviews

The dates of the most recent periodic safety reviews are shown in Table 1 on the characteristics of the nuclear installations that are subject of the report. Reports from the PSR are available in Slovak version on the website of ÚJD SR.

8(c) 2.1.IV. The impact of ageing, operational experience and development in international standards in PSR

Examples of practical improvements identified during PSR are specified in Chapter 6.1.(c) IV.

8(d) On-site emergency preparedness and response (Art. 8d)

Article 8(d)

- 1. Without prejudice to the provisions of the Directive 2013/59/Euratom, Member States shall ensure that the national framework requires that an organisational structure for on-site emergency preparedness and response is established with a clear allocation of responsibilities and coordination between the licence holder, and competent authorities and organisations, taking into account all phases of an emergency.
- Member States shall ensure that there is consistency and continuity between the on-site emergency preparedness and response arrangements required by the national framework and other emergency preparedness and response arrangements required under Directive 2013/59/Euratom.'

8(d) 1. On-site organizational structure for the emergency preparedness and response

8(d) 1.1. Overview of the requirements of the national framework for the organizational structure for emergency preparedness and response

Emergency preparedness legislation

Legislative regulations governing emergency planning, including laws in the field of crisis management, civil protection and radiation protection:

- Act No. 541/2004 Coll. on the peaceful uses of nuclear energy (Atomic Act) and on amendments to certain laws as amended,
- ÚJD SR Decrees
- Constitutional Act No. 227/2002 Coll. on the security of the state in time of war, state of war, state of emergency as amended, which inter alia, concerns also addressing situations related to terrorist acts and violent unlawful conduct,
- Act of NC SR No. 42/1994 Coll. on civil protection of the population, as amended,
- Act No. 387/2002 Coll. on state management in crisis situations outside the time of war and state of war, as amended,
- Act No. 129/2002 Coll. on an integrated rescue system, as amended,
- Act No. 261/2002 Coll. on the prevention of major industrial accidents, as amended,
- Act No. 45/2011 Coll. on the critical infrastructure,
- Act No. 179/2011 Coll. on economic mobilization and on amendments to Act No. 387/2002 Coll. on state management in crisis situations outside the time of war and state of war, as amended,
- Act No. 87/2018 Coll. on radiation protection and on amendments to certain laws.

All of the aforesaid documents take into consideration in regard of emergency preparedness the relevant European Union directives and the IAEA *safety standards*.

8(d) 1.II. Requirements for a clear definition of responsibilities and coordination between the licence holder and the competent authorities and organizations, taking into account all phases of the emergency.

National Organization on Emergency Preparedness

The Act No. 387/2002 Coll. establishes the scope of powers of the public authorities in managing the state in crisis situations outside time of war and hostilities, the rights and obligations of legal entities and of individuals in preparing for emergencies outside time of war and hostilities, and in resolution of these, and sanctions for breach of obligations established by this Act.

Crisis management bodies are: Government of the Slovak Republic; the Security Council of the Slovak Republic; ministries and other central government authorities; the National Bank of Slovakia; security council of the region, district office; security council of the district; municipality.

The Government of the Slovak Republic, as the supreme authority of crisis management, in compliance with the Act No. 378/2002 Coll. establishes a Central Crisis Staff as its executive body that coordinates the activity of government bodies, local government bodies and of other components designed to resolve a crisis situation during a crisis period, i.e. during resolution of an incident or an accident of a nuclear installation or during transport of nuclear material.

The chairman of the Central Crisis Staff is the Minister of Interior of the Slovak Republic.

To ensure necessary measures to cope with a nuclear installation emergency and measures to protect the public and the economy in an occurrence of event with environmental impacts, the National Emergency Preparedness Organization (*Figure 11*) is structured into three levels as follows:

<u>The first level</u> is formed by emergency committees of nuclear *installations* with the prime function made of management of works and measures at nuclear installation sites so as to enable identification of the technological equipment conditions, and the management of measures to cope with emergency and to mitigate the consequences on personnel, plant, environment, and population.

Another function of this level is the informative function for activities of state administration bodies on the level of local state administration, which will provide for information concerning the equipment conditions and the possible impacts on surrounding.

<u>The second level</u> is organized on the regional level and consists of crisis staffs as crisis management bodies of the local government, the territory of which falls into an area at risk, in which there may be threat to life, health or property, and where measures are planned to protect the population. This area is defined by the boundaries of the plant of NI JAVYS Jaslovské Bohunice, 21 km around NI V-2 Jaslovské Bohunice and by radius of 20 km around NPP Mochovce.

<u>The third level</u> is a national level, the Central Crisis Staff of the Government of the Slovak Republic with its supporting units (e. g.: Emergency Response Centre of ÚJD SR – ERC, Centre of Radiation Monitoring Network – ÚRMS, Central Monitoring and Control Centre – CMRS). Their task is to address an emergency, if the scope of an extraordinary event exceeds the territory of the region.


Figure 10: Scheme of vertical division of the national response organization to an emergency due to a radiation accident

8(d) 1.III. Examples of practical implementation

Systems for maintaining emergency preparedness

Emergency training of plant personnel is carried out according to its assignment in a form of lectures, group seminars, practical demonstrations, practical training – exercises *and outdoor drills*. A separate part consists of emergency trainings of shift personnel of *OHO*. In both sites of licence holders (SE, a.s. and JAVYS, a. s.) shift drills are performed twice a year, site-wide emergency drills with all site personnel involved are held annually and a collaboration emergency drill laid on in concurrence with local state administration and self-governing authorities, ERC ÚJD SR, or other components of OHO (fire brigade units, health care, *police*, army, *chemical laboratories of MV SR* etc.) once every 3 years.

The exercises are attended by observers and *assessors*, who assess the exercises and based on their conclusions, measures are taken to improve the activities of individual OHO components. *The implementation of the measures shall be subject to control by the management of the licence holder and the inspectors of the Authority.*

The aim of interoperability exercises is to verify the OHO activities of the licence holder and its cooperation and communication with crisis management bodies and components of the integrated rescue system (IRS) in dealing with the consequences of events, and thus verify the effectiveness of emergency plans and OHO follow-up procedures. During exercises, the information flow and the ability to implement protective measures for the staff of nuclear installation, as well as measure to protect the population, are tested. An equally important goal is to practice activities of crisis staffs and their ability to plan and implement measures to protect the population.

Equipment and means of emergency preparedness

These are designed to ensure the OHO activities of the licence holder with available instrumentation for rapid detection and continuous assessment of events. The following means of emergency response are available to the OHO:

- Main control rooms are the primary center for emergency response management;
- The Emergency Control Centre (hereinafter only as "ECC") with its support centres is the workplace of the Emergency Commission. It is located in the shelter, which is activated in the event of an incident or accident. These workplaces are equipped with, among other things, appropriate decision support applications.
- Technical support centres, from which in case of severe accidents and unavailability of Unit Control Room, among other things, it is possible to control designated systems and equipment for severe accident management.
- Back-up emergency centre (ZHRS) serves as a substitute workplace for emergency committee in case of *uninhabitability of ECC and/or* unfavourable radiation, weather *or other* condition *preventing accessibility of ECC* at *Jaslovské* Bohunice site or Mochovce site. It is located within the laboratories of radiation control of the area at *Jaslovské* Bohunice site (Trnava) and Mochovce site (Levice).
- Civil defence shelters are used for shift personnel and intervening personnel and are used to dispense individual protection equipment and specialized equipment for intervening units.
- CD assembly points serve for assembly of employees (not included in ERO) and other persons staying in the territory of NI. With their equipment they create conditions for short-term stay of employees using also the means of individual protection and for gathering the staff before possible evacuation.
- In-house Medical Centre is intended for basic medical provision, giving pre-medical and medical aid and preparation for transfer of those afflicted to specialized health care facilities. Also part of In-house Medical Centre is a decontamination point and workplaces to measure individual internal contamination.
- On-site communication facilities and equipment:
 - a) public telephone network,
 - b) power telephone network,
 - c) mobile telephone sets,
 - d) paging network,

- e) in-house radio and operational (unit) radios,
- f) internet, fax network.



Figure 11: Bunker emergency control centre in Jaslovské Bohunice

Response in case of an event

In accordance with legal framework the licence holder notifies the central government authorities already at the first level – alert/emergency. Then informs the central government authorities, among them also ÚJD SR on the developments. On the first level it starts the warning system in the vulnerable objects of NI. On the second level it starts the warning system on the whole territory of a NI. On the third level it triggers the warning system and notification system in vulnerable sectors in the area at risk around the NI. At the regional level, plans are developed for the protection of the population in the emergency planning zone, which include measures to protect the population, health, property and the environment, as well as link to the internal emergency plan (Table 6):

Period (Phase)	Measures in connection with the time course of an incident or accident of NI
Threat/ Emergency	Notification of emergency staff (Emergency response organization) and preparation for public notification.
	Preparation for taking urgent measures in emergency planning zone in early phase of the accident.
	Notification of public about measurement taken during emergency phase.
Early Phase (urgent measures)	Warning of emergency staff (Emergency response organization) and also public warning.
	Monitoring of radiological situation.
	Access regulation (persons and vehicles).
	Sheltering.

	lodine prophylaxis.
	Evacuation.
	Use of individual protection means and special individual protection means.
	Partial sanitary cleaning of persons and objects.
	Ban of non-protected food, water and feed consumption.
Intermediate and Late Phase (follow-up measures)	Control of persons and vehicles movement.
	Control of consumption of food, water and feed contaminated by radioactivity.
	Relocation of population according to the evaluation of current radiation situation and prognosis of its development.
	Deactivation of impacted area.

Table 6: Measures in connection with the time course of an incident or accident

Public Protection Plans (Off-site Emergency Plans)

Protective measures are part of the public protection plan, drawn up by the territorially competent state authorities and municipalities located in the area at risk with a defined distance up to 21 km for NPP Bohunice V-2 and 20 km for NPP Mochovce. The aforesaid public protection plans are linked to the off-site emergency plan of the licence holder that shall be obliged to present the public protection plans elaborator with documents relating to the public protection in the area of threat.

Public protection plans developed for the region territory are subject to the process of assessment by ÚJD SR and of approval by the Slovak Ministry of Interior. They describe in detail the method of implementing measures, with selected measures containing activity by severity level and time behaviour of an incident or an accident including available and usable workforces and means to carry out rescue works and ensure the implementation of public protection measures. Part of documentation are also activity methodologies, databases and aids necessary for effective and proper decisions.

In the event of an extraordinary event having a nature of radiation event at NI, the local state administration bodies – crisis management bodies, provide measures resulting from the population protection plans. The activities in question are performed by the relevant crisis staffs, who cooperate with the Central Crisis Staff of the Slovak Government, if needed. In order to avoid danger of delays in the performance of tasks related to population protection, the relevant crisis staffs are included in the organization of emergency response within the Slovak Republic.

In accordance with the internal emergency plan, the population protection plan, and on the basis of assessment of the situation with the technology, the determination of the source term, the measured values of the teledosimetric system, the first measurements of the radiation situation in the vicinity of NI and of the meteorological situation, is provided by the licence holder in the event of occurrence of grade 2 event (an event within the territory of the nuclear installation) notification of the relevant

authorities and organizations about the risk, and in case of grade 3 event (an event outside the territory of the nuclear installation) warning the population without any delay. Subsequently, based on the decisions of public administration authorities, of the local government and the municipalities, further urgent follow-up measures are ensured, mainly consisting of iodine prophylaxis, going to shelters or evacuation and other. These measures are carried out in territories that have been affected by the consequences of radiological event, including territories where the consequences of an emergency – in terms of forecasting – can be expanded.

8(d) 2. Consistency and continuity between measures of emergency preparedness and the Directive 2013/59/Euratom

8(d) 2.I. Measures ensuring consistency between the national policy and the Council Directive 2013/59/EURATOM

According to Annex 14 to the Act No. 87/2018 Coll. on radiation protection, the response to an emergency situation, which is an accident pursuant to Section 27 par. 3 (c) of Act No. 541/2004 Coll. on peaceful uses of nuclear energy (Atomic Act) and on amendments to certain regulations, means timely implementation of actions that include, inter alia:

- a) The introduction of protective measures to protect the population,
- *b)* Assessing the effectiveness of strategies and measures put in place, and adapting them to the specific situation,
- c) comparing doses with a valid reference level, focusing on groups of population, where the doses exceed the reference level,
- d) implementing, where necessary, additional protection strategies on the basis of specific conditions and available information.

Protective measures must be adapted to the situation and implemented in relation to the source of ionizing radiation in order to reduce direct exposure, prevent leakage of radionuclides, reduce radionuclides leakage or stop radionuclide or ionizing radiation leakage; in relation to the environment, to reduce the transfer of radioactive substances to an individual from the population and thus reduce his/her exposure caused by radioactive substances by important exposure routes and in relation to an individual from the population, to reduce his/her exposure, and if necessary, to ensure his/her treatment.

In an emergency, which is an accident pursuant to Section 27 par. 3 (c) of Act No. 541/2004 Coll. on peaceful uses of nuclear energy (Atomic Act) and on amendments to certain regulations, PHA SR representative together with member of the Emergency Staff of ÚJD SR in the Emergency Response Centre of ÚJD SR submits proposals to the relevant bodies of crisis management for implementation of protective measures pursuant to Section 144 par. 3 of Act No. 87/2018 Coll. on radiation protection. When deciding on the adoption of protective measures, the relevant state administration body shall proceed according to the general criteria for the adoption of protective measures specified in Annex 12 to the Act No. 87/2018 Coll. on radiation protection.

The facts that indicate the suspicion or actual occurrence of a nuclear emergency indicate establishment of a nuclear installation according to the Atomic Act, are:

- a) technological, radiation and meteorological online data from nuclear installation and Slovak Hydrometeorology Institute, which is available to ÚJD SR continuously,
- b) the values of measurement results from monitoring the radiation in the Slovak Republic, which are higher than the intervention levels defined in the monitoring plan or values of intervention levels defined in the program of monitoring discharges or in the program of monitoring workplace environment,
- c) information on the occurrence of nuclear accident outside the territory of SR notified by the European Commission, the IAEA or a neighbouring state to ÚJD SR pursuant to special regulation (Section 4 of Act No. 541/2004 Coll. on peaceful uses of nuclear energy (Atomic Act).

In order to limit exposure during accident, in addition to the general criteria for the adoption of protective measures pursuant to Act No. 87/2018 Coll. on radiation protection, values of directly measurable quantities are specified (hereinafter only as the "Operational Intervention Levels") according to MZ SR Decree No. 99/2018 on securing radiation protection, which when exceeded, protection measures should be considered for adoption.

These are pre-calculated values that correspond to the relevant general criterion for implementing the protective measure. They reflect the parameter of a specific source of ionizing radiation, the nature of the event and the meteorological situation.

Where specific field measurement results are to be a decisive criterion for carrying out or correcting urgent protective measures, appropriate validated and regularly calibrated gauges must be used for measurements, and appropriate pre-defined conditions of measurement, evaluation of measured data and measurement uncertainty also should not be neglected.

OIL were transposed to the legislation of the Slovak Republic from the IAEA documents, namely: General Safety Guide No. GSG-2 Criteria for use in Preparedness and Response for a Nuclear or Radiological Emergency of 2011, and Emergency Preparedness and Response: Actions to Protect the Public in an Emergency Due to Severe Conditions at Light Water Reactor of 2013.

8(e) Peer reviews (Art. 8e)

Article 8e

- 1. Member States shall, at least once every 10 years, arrange for periodic self-assessments of their national framework and competent regulatory authorities and invite an international peer review of relevant segments of their national framework and competent regulatory authorities with the aim of continuously improving nuclear safety. Outcomes of such peer reviews shall be reported to the Member States and the Commission, when available.
- 2. Member States shall ensure that, on a coordinated basis:

a) a national assessment is performed, based on a specific topic related to nuclear safety of the relevant nuclear installations on their territory;

b) all other Member States, and the Commission as observer, are invited to peer review the national assessment referred to in point (a);

c) appropriate follow-up measures are taken of relevant findings resulting from the peer review process;

- d) relevant reports are published on the above mentioned process and its main outcome when results are available.
- 3. Member States shall ensure that arrangements are in place to allow for the first topical peer review to start in 2017, and for subsequent topical peer reviews to take place at least every six years thereafter.
- 4. In case of an accident leading to situations that would require off-site emergency measures or protective measures for the general public, the Member State concerned shall ensure that an international peer review is invited without undue delay.'.

8(e) 1. Periodic self-assessments and international peer reviews

8(e) 1.I. Integrated Regulatory Review Service (IRRS) mission

The last IRRS mission in Slovakia was in 2012, followed by a Follow-Up mission in 2015. The IRRS mission focused on nuclear safety. Radiation protection was covered only in connection with the nuclear installations (IRRS modules 1 to 10).

The IRRS mission identified 8 examples of good practice, 20 suggestions for improvements ("S") and 11 recommendations ("R") addressed to the Slovak Government, ÚJD SR, MZ SR (ÚVZ SR) and MH SR. The Action Plan to address measures from the IRRS mission, stating the tasks for the ÚJD SR staff based on suggestions and recommendations addressed to ÚJD SR, was developed for the period August 2012 – November 2015.

After the Follow-Up mission in 2015, 4 recommendations and 2 suggestions for improvements remained open. The Follow-Up mission also identified 1 new example of good practice, 1 new suggestion for improvement and 1 new recommendation.

Reports from both missions are available on the website of ÚJD SR (https://bit.ly/2PlzkVm; https://bit.ly/2TkYSd3).

The next IRRS mission will take place in 2022.

8(e) 1.II. IRRS reporting status

Information on the publication of reports from the missions on the website of ÚJD SR was notified to the EU Member States and the Commission at the meeting of the Atomic Questions Working Party (AQWP).

8(e) 2. Topical peer reviews (TPR)

8(e) 2.I. Participation of the Slovak Republic in TPR

Council Directive 2014/87/EURATOM established a European system of topical peer reviews, which started in 2017 and will take place every six years.

In October 2018, ENSREG approved the report of the first topical peer review (TPR) on the topic "Ageing Management of Nuclear Power Plants and Research Reactors" and related countryspecific findings. TPR is the most important safety-oriented exercise after Post-Fukushima Stress Tests in Europe.

The timely and effective completion of this review highlights the continuous improvement of the safety culture in the EU and surrounding countries. The process is currently ongoing with the development of national action plans that respond to the results of the peer review.

The subject of the first review (ageing management) was chosen on the basis of the age profile and potential long-term operation of European nuclear power plants. The exercise was developed by ENSREG with the technical support of WENRA. Licence holders developed self-assessments, on the basis of which the national regulatory authorities prepared National Assessment Reports (NAR), published at the end of 2017. In January 2018, these reports were made available for questions and comments from stakeholders. Peer reviewers, experts and the civil society asked more than 2,300 questions. In May 2018, ENSREG organized a weekly workshop with 140 experts to discuss the results of self-assessments, questions and comments on national reports, as well as answers to questions. The preparation of TPR was fully transparent.

8(e) 2.II. National ENSREG information

Information on the Slovak Republic are available on the ENSREG website (http://www.ensreg.eu/country-profile/Slovak%20Republic)

8(e) 2.III. Arrangements for topical peer reviews

No reporting required.

8(e) 2. IV. Reporting of an accident or incident

No accident or incident occurred which would require off-site emergency measures or protective measures for the general public.

9 Annexes

Annex 1 ÚJD SR Decrees

Annex 2 ÚJD SR Safety Guidelines

ÚJD SR Decrees

ÚJD SR Decree No. 48/2006 Coll.	on details of notification of operational events and events during shipment, as well as details of investigation of their reasons
ÚJD SR Decree No. 51/2006 Coll.	on details concerning requirements for provision of physical protection.
ÚJD SR Decree No. 52/2006 Coll.	on professional competency.
ÚJD SR Decree No. 54/2006 Coll.	on accountancy for and control of nuclear material as well as notification of selected activities.
ÚJD SR Decree No. 55/2006 Coll.	on details concerning emergency planning in case of nuclear incident or accident.
ÚJD SR Decree No. 57/2006 Coll.	on details concerning the requirements for shipment of radioactive material.
ÚJD SR Decree No. 58/2006 Coll.	on details concerning the scope, content and method of preparation of nuclear installation documentation needed for certain decisions.
ÚJD SR Decree No. 430/2011 Coll.	on details on nuclear safety requirements for nuclear facilities.
ÚJD SR Decree No. 431/2011 Coll.	on a quality management system.
ÚJD SR Decree No. 30/2012 Coll.	laying down details of requirements for the handling of nuclear materials, nuclear waste and spent nuclear fuel.
ÚJD SR Decree No. 33/2012 Coll.	on the regular, comprehensive and systematic evaluation of the nuclear safety of nuclear equipment.
ÚJD SR Decree No. 170/2015 Coll.	establishing a list of radioactive materials, their quantities and their physical and chemical parameters justifying the low risk of nuclear damage.
ÚJD SR Decree No. 112/2020 Coll.	Laying down the special materials and equipment falling under the supervision of the Nuclear Regulatory Authority of the Slovak Republic

ÚJD SR safety guidelines

- BNS III.4.1/2000 Requirements on ÚJD SR permit issue for fuel use in WWER 440 reactors
- BNS III.4.3/2000 Requirements on assessment of fuel loading for WWER 440 reactors
- **BNS IV.1.3/2005** Requirements for Design and Operation of Nuclear Spent Fuel Storage Facility
- **BNS I.2.5/2005** ÚJD SR requirements on chapt. 16 of Safety analysis report "Limits and Conditions"
- **BNS I.8.1/2005** Reguirements for Preliminary Plan of Physical Protection and Plan of Physical protection
- **BNS III.4.4/2007** Requirements for realization and evaluation of results of physical tests in startup process
- BNS II.1.1/2008 Accounting and control of nuclear materials
- BNS II.5.4/2009 Qualification of systems for non-destructive examination in nuclear power engineering
- **BNS II.5.5/2009** Examining of mechanical features, chemical composition and classified characteristics of resistance against violation of marginal condition of materials and weld joins of engineering- technology components of installations of WWER440 type
- **BNS II.5.6/2009** The rules on design, production, montage, repairing, changing and reconstruction of engineering- technology components of classified equipments of nuclear installations of WWER440 type
- BNS II.3.3/2011 Metallurgical products and spare parts for nuclear power plants
- BNS II.5.3/2011 Welding materials for welding of engineering & technological components of NPPs
- BNS II.5.1/2012 Welding at nuclear power installations. Basic requirements and rules
- **BNS II.5.2/2012** Supervision of welding and quality of welded joints of selected nuclear power installations. Requirements
- **BNS I.1.2/2014** The Scope and the Content of the Safety Report
- BNS I.9.2/2014 Ageing management of Nuclear Power Plants Requirements
- BNS I.4.4/2014 Operation of nuclear facility after reaching its designed lifecycle Requirements and Guidelines

- BNS I.12.3/2014 PSA Quality for PSA applications
- **BNS II.3.1/2016** Assessment of tolerability of errors detected during operational inspections of selected nuclear installations
- **BNS II.3.4/2016** Rules for the design, manufacture and operation of degradation monitoring systems of safety relevant components of NI Part 1. Corrosion Monitoring
- **BNS II.3.5/2016** Rules for the design, manufacture and operation of degradation monitoring systems of safety relevant components of NI Part 2. Monitoring the thermal aging processes of structural materials of NI
- **BNS II.3.6/2016** Rules for the design, manufacture and operation of degradation monitoring systems of safety relevant components of NI Part 3. Monitoring of radiation degradation processes of structural materials of NI
- BNS II.9.1/2016 Direct sampling of small samples from safety relevant components of NI
- **BNS II.9.2/2016** Assessment of mechanical characteristics of materials in operated selected mechanical engineering equipment using SPT methodology
- BNS I.4.2/2017 Requirements for the development of PSA
- **BNS I.9.3/2017** Requirements for the content and scope of decommissioning documentation that is submitted as part of an application in the proceedings for consent under Section 5 par. 2 of the Atomic Act, and in the authorization procedure under Section 5 par. 3 (a) to (d) of the Atomic Act
- **BNS I.9.4/2017** Requirements for the recording of data relevant for the decommissioning of a nuclear installation
- **BNS I.9.5/2017** Requirements for safety analyses of activities carried out during decommissioning of nuclear installations
- **BNS I.4.5/2018** Requirements for the safety of nuclear installations in relation to natural hazards
- **BN 1/2019** Quality assurance requirements for the safety analysis software (4th edition revised and supplemented)
- **BN 2/2019** Single failure criterion (3rd edition revised and supplemented)
- **BN 3/2019** Requirements for the description of the reactor and its design basis in the safety analysis report (4th edition revised and supplemented)
- **BN 4/2019** Requirements for carrying out and evaluating the results of nuclear security culture self-assessment
- **BN 5/2019** Requirements for deterministic safety analyses of NPPs with VVER-440/V213 (6th edition revised and supplemented)
- BN 1/2020 Comprehensive periodic safety review of nuclear safety (3rd edition revised and supplemented)

BN 2/2020Requirements for ensuring fire protection and fire safety of nuclear installations
from the point of view of nuclear safety (4th edition - revised and supplemented)