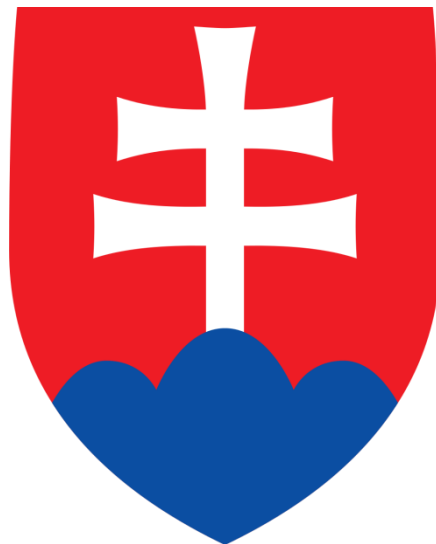


NATIONAL REPORT OF THE SLOVAK REPUBLIC



**COMPILED IN TERMS
OF THE JOINT CONVENTION ON THE SAFETY
OF SPENT FUEL MANAGEMENT
AND ON THE SAFETY OF RADIOACTIVE WASTE
MANAGEMENT**

August 2024

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Abbreviations Used

ALARA	As Low As Reasonably Achievable
BIDSF	Bohunice International Decommissioning Support Fund
BSC	Bohunice RAW Treatment Center
BUC	Burnup credit
CAF	Common Assessment Framework
CCS	Central Crisis Staff
CMRS	Central Monitoring and Control Centre
EC	European Commission
EIA	Environmental Impact Assessment
<i>ERC</i>	<i>Emergency Response Centre</i>
ETR	Emergency transport rules
EU	European Union
FCC	Fibre-concrete container
FS KRAO	Facility for Final Treatment and Conditioning of Liquid Radioactive Waste
HRK	Emergency, control and compensation assembly
HÚ	Deep repository
HVB	Main Generation Unit
IAEA	International Atomic Energy Agency
IED	Individual dose equivalent
INES	International Nuclear Event Scale
IRAW	Institutional Radioactive Waste
IRRS	Integrated Regulatory Review Service
ISFS	Interim Spent (Nuclear) Fuel Storage
ISNFSF	Interim Spent Nuclear Fuel Storage Facility
IS RAO	Integral Radioactive Waste Storage Facility
IS RAW	Integral Storage Facility for Radioactive Waste
IMS	Integrated Management System
JAVYS, a. s.	Jadrová a vyradovacia spoločnosť / Nuclear Decommissioning Company
KED	Collective dose equivalent

KRAO	Liquid radioactive waste
L&C	Limits and Conditions for operation
LLW	Low level radioactive waste
MD SR	Ministry of Transport of the Slovak Republic
MH SR	Ministry of Economy of the Slovak Republic
MO SR	Ministry of Defence of the Slovak Republic
MPSVR SR	Ministry of Labour, Social Affairs and Family of the Slovak Republic
MPRV SR	Ministry of Agriculture and Rural Development of the Slovak Republic
MŠVVaŠ SR	Ministry of Education, Science, Research and Sport 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
NI	Nuclear Installation
NPP	Nuclear Power Plant
NPP A1	Nuclear Power Plant A1 Jaslovské Bohunice
NPP V1	Nuclear Power Plant V1 Jaslovské Bohunice (Units 1 &2)
NPP V2	Nuclear Power Plant V2 Jaslovské Bohunice (Units 3 & 4)
NPP Mochovce	Nuclear Power Plants Mochovce
OIL	Values of directly measurable quantities
PHARE	EU Initiative for economic integration of CEE countries
PoSAR	Pre-operational Safety Report
PRAO	Solid radioactive waste
PS	Operational set
PSA	Probabilistic safety assessment
PSR	Periodic Safety Review
RAW	Radioactive waste
RF	Russian Federation
RFSS	Representative full scale simulator
RMUO	Radioactive materials of unknown origin
RÚ RAO	National Repository for Radioactive Waste

SE, a. s.	Slovenské elektrárne, joint stock company
SE, a. s. - VYZ	Decommissioning of NI and radwaste and spent fuel management, former plant of SE, a. s.
SEIA	<i>Strategic Environmental Impact Assessment</i>
SIEA	<i>Slovak Innovation and Energy Agency</i>
SNF	Spent Nuclear Fuel
SR	Slovak Republic
STN	Slovak technical standard
TK	Transportation container
TK C-30	Transportation container for SNF of C-30 type
ŤK	Heavy metal
t _{TK}	Tons of heavy metal uranium
TSÚ RAO	Technology of treatment and conditioning of RAW
TV	Television
UBN	Event without consequences
ÚJD SR	Nuclear Regulatory Authority of SR
US NRC	United States Nuclear Regulatory Commission
ÚRMS	Radiation Monitoring Network Headquarters
ÚVZ SR	Public Health Authority of SR
VBK	Fibre-concrete container
VLLW	Very low level radioactive waste
VUJE, a. s.	VUJE, a. s. Trnava – Engineering, design and research organization
WWER	Water-water power reactor
WANO	World Association of Nuclear Operators
ZRAM	Captured radioactive materials
USSR	Union of Soviet Socialist Republics

A Introduction

The Slovak Republic deposited the instrument of ratification of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (Notification of the Ministry of Foreign Affairs of the SR No. 125/2002) (hereinafter referred to as the “Joint Convention”)¹ on 6 October 1998 with the Depositary, the Director General of the International Atomic Energy Agency. The presented National Report describes measures adopted with the aim to comply with the provisions of the Joint Convention. It was compiled in accordance with Article 32 of the Joint Convention, and its structure respects the Guidelines regarding the form and the structure of national reports. ***Any updates or additions to the previous Report are indicated in Italics.***

The Slovak Republic operates a total of 5 Units with VVER-440 nuclear reactors. Two at the Jaslovské Bohunice site (NPP Jaslovské Bohunice 3,4 referred to as NPP V2) and *three* at the Mochovce site (NPP Mochovce 1,2,3). Two Units (NPP Jaslovské Bohunice V1) are in the process of decommissioning. Spent nuclear fuel (“SNF”) from these Units has been taken to the Interim Spent Fuel Storage (“ISFS”).

Also located at Jaslovské Bohunice is the NPP A1 with heavy water reactor cooled with carbon dioxide (HWGCR – 150 MW), which used natural uranium as fuel. NPP A1 was shut-down in 1977 following an accident (INES 4), and *the completion of stage III and IV of decommissioning of NPP A1 and preparation of documentation for the authorisation for stage V of decommissioning are currently in progress.* The SNF was repatriated to the Russian Federation (“RF”) under the original contract. The transports were completed in 1999.

Radioactive waste treatment technologies are located at the Jaslovské Bohunice and Mochovce sites. They are part of nuclear installation (“NI”) Technology for Treatment and Conditioning of Radioactive Waste (hereinafter referred to as “TSÚ RAO”), Facility for Final Treatment and Conditioning of Liquid RAW (hereinafter referred to as “FS KRAO”).

The National Low-level Radioactive Waste Repository (hereinafter referred to as “RÚ RAO”) has been in operation since 2001 at the Mochovce site.

The ISFS has been in operation at the Jaslovské Bohunice site since 1987, where a project to enhance safety and increase storage capacity was implemented. A small part of SNF from the VVER-440 reactors (697 fuel assemblies) was shipped to the former Union of Soviet Socialist Republics (“USSR”) prior to 1987.

A detailed description of technologies for the management of SNF and RAW is given in the following chapters of this Report. The licensees for operation and decommissioning of nuclear installations are Slovenské elektrárne, a. s. (hereinafter referred to as “SE, a. s.”) and Nuclear and Decommissioning Company (hereinafter referred to as “JAVYS, a. s.”).

¹ <https://www.iaea.org/sites/default/files/infirc546.pdf>

In 2011, an amendment to Act No. 541/2004 Coll. on the Peaceful Uses of Nuclear Energy (Atomic Act) (hereinafter only as “Act No. 541/2004 Coll. (Atomic Act)”) set the authorisation for operation of all nuclear installations for an unlimited period of time (previously limited to 10 years).

By Resolution No. 256/2014, the Slovak Government adopted the “Policy, Principles and Strategy for Further Development of Nuclear Safety“. *The Government – through its Resolution No. 221 of 17 April 2024, mandated the Chairperson of ÚJD SR, to submit an updated “Policy, Principles and Strategy for the Safe Use of Nuclear Energy in the Slovak Republic“ by 30 November 2024.*

Strategic documents that exist in the SR and refer to nuclear safety:

- Programme Declaration of the Government of SR for the period 2023– 2027,
- Energy Security Strategy of SR (2008),
- *National Programme for the Management of Spent Nuclear Fuel and Radioactive Waste in the SR.*

An updated Integrated Climate and Energy Plan of SR for the period 2021 – 2030 is being developed.

The Nuclear Regulatory Authority of the SR (hereinafter referred to as the “ÚJD SR“) is entrusted with the state supervision over nuclear safety in the management of radioactive waste (RAW) and SNF. The basic law for the peaceful uses of nuclear energy is the Act No. 541/2004 Coll. I. (Atomic Act). ÚJD SR also performs supervision over NIs under Act No. 50/1976 Coll. on Spatial Planning and Building Regulations (Building Act), as a special building authority with the competence to issue decisions for permitting siting of NIs in the SR, authorisations for their operation (Final Approval Decisions), as well as any changes to the NIs.

The exercise of state supervision over radiation protection *at all workplaces where sources of ionizing radiation are used and where radioactive materials are managed, including nuclear installations*, is provided by the Public Health Authority of the Slovak Republic (hereinafter referred to as the “ÚVZ SR“) under Act No. 87/2018 Coll. on radiation protection as *amended* (“Act No. 87/2018 Coll. on radiation protection“).

Pursuant to Act No. 87/2018 Coll. on radiation protection, effective from 1 April 2018, the Ministry of Transport of the Slovak Republic (hereinafter only as “MD SR“) exercises state supervision in radiation protection during shipments of radioactive and nuclear materials.

Labour Inspection – supervision over compliance with legal regulations and other regulations to ensure occupational health and safety at nuclear facility is performed by the Labour Inspectorate Nitra under Act No. 125/2006 Coll. on Labour Inspection and Act No. 82/2005 Coll. on Illegal Work and Illegal Employment. Verification of compliance with the safety requirements of classified technical equipment and technical installations shall be carried out by authorised legal persons pursuant to Act No. 124/2006 Coll. on Occupational Health and Safety.

The impact assessment of the NI on the environment is the responsibility of the Ministry of Environment of SR (hereinafter as the “MŽP SR“) and is performed in accordance with the Act No. 24/2006 Coll.

on Environmental Impact Assessment (hereinafter as the “Act No. 24/2006 Coll. on Environmental Impact Assessment”).

The Slovak Republic is a State Party to all major international treaties and conventions in the field of peaceful uses of nuclear energy.

The list of nuclear installations covered by the Joint Convention is given in the Annexes L I. and III.

Previous National Reports from y. 2003, 2005, 2008, 2011, 2014, 2017, 2020 are available from the website of ÚJD SR: www.ujd.gov.sk.

Implementation of recommendations and actions from the 7th Review Meeting

The challenges or tasks identified for the Slovak Republic:

- 1. To develop and implement and regularly exercise a National Emergency Plan to prepare for and respond to radiological or nuclear emergencies (in accordance with the recommendations of the IRRS – Integrated Regulatory Review Service – Mission 2022):***

Action completed.

In accordance with the recommendations of the IAEA IRRS Mission to SR, the Ministry of Interior of SR adopted the “Public Protection Plan – radiation countermeasures“ developed in accordance with Act No. 42/1994 Coll. on Civil Protection as amended as the Documentation on radiation countermeasures in November 2023. It is a basic guideline document for the national response level or nuclear or radiation accidents, and is part of the comprehensive Public Protection Plan of SR, which is under preparation. The documentation on counter-radiation measures is logically and hierarchically linked to the system of civil protection plans at international, national, regional, municipal and licensee levels, and was reviewed to a limited extent during the INEX 6 exercise in February 2024. This Public Protection Plan - radiation countermeasures was part of the INEX 6 exercise.

- 2. Continue development and implementation of national strategy for management of SF and radioactive waste intended for geological disposal, including clearer intention with respect to national (DGR) vs. international solutions:***

Measure being implemented on an ongoing basis.

In December 2019, JAVYS, a. s. developed and approved a detailed schedule for the preparation of a deep geological repository. This document was sent to MH SR at the beginning of 2020, and was also incorporated into the update of the “National Policy and National Programme for Spent Nuclear Fuel and Radioactive Waste Management in the SR“, which is currently under SEIA.

In November 2019, the Nuclear Regulatory Authority of the Slovak Republic requested the IAEA to organize and carry out the Integrated Review Service for Radioactive Waste and Spent Fuel Management, Decommissioning and Remediation (ARTEMIS) peer review mission in Slovakia,

based upon the IAEA Safety Standards and technical guidance as well as international good practice. The mission took place in February 2023 in Bratislava.

The ARTEMIS Review Team concluded that:

- the Slovak Republic has established a good basis for the safe and responsible management of radioactive waste and spent fuel as well as for decommissioning;*
- the current arrangements for the management of radioactive waste from decommissioning of nuclear installations are of a high standard;*
- there is a considerable work to be done in preparation for geological disposal.*
- The application of an immediate dismantling strategy combined with the treatment of all materials arising was considered to be outstanding and recognised as a good practice.*

The ARTEMIS mission recommended to the government to expedite the decision for the undertaking of further work on geological disposal.

In August 2023, a briefing document “Report on the outcomes of the international expert mission ARTEMIS to review the national policy and national programme for the management of spent nuclear fuel and radioactive waste in the SR held from 12 to 22 February 2023 in Bratislava”, was submitted to the Government, which took note of it.

3. Early public involvement in the site selection process for disposal facilities:

Measure being implemented on an ongoing basis.

In December 2019, a strategy for communication with the public was developed “Draft schedule for the preparation of a deep geological repository and a strategy for communication with the public on development of a deep geological repository in the SR”. Following the approval of the updated “National Programme for the Management of Spent Fuel and Radioactive Waste in the SR” by the Slovak Government, public involvement activities on the development of deep geological repository will be implemented in accordance with this document.

The need to establish a programme for the active participation of stakeholders, including the public, regarding the management of spent nuclear fuel and radioactive waste, in particular in site selection for a deep geological repository and its planned development, was identified as one of the recommendations of the IAEA ARTEMIS Mission to the SR in February 2023. In response to the conclusions of this Mission, an Action Plan was developed and noted by the Slovak Government in August 2023.

The ARTEMIS Review Team observed very limited evidence of engagement with interested parties (stakeholders), including the public, particularly regarding decision making in the siting of the geological disposal facility.

The ARTEMIS mission recommended to the Government to establish a programme of proactive involvement of interested parties, including the public, regarding radioactive waste and spent fuel management, particularly in the siting of a geological disposal facility and its planned evolution.

The State Parties to the Joint Convention have been informed about the programmes to enhance the safety of nuclear installations for the management of spent fuel and radioactive waste. The Slovak Republic will report on the progress in these programmes at the next review meeting of the Parties to the Joint Convention to be held in March 2025, with the emphasis on:

4. Update of the National Policy and National Programme for the Management of Spent Nuclear Fuel and Radioactive Waste in the SR (in 2022 – postponed due to the COVID-19 pandemic):

Measure completed.

The draft document was part of the information package for the (ARM) ARTEMIS mission in February 2023, and the recommendations were reflected in an annex to the document.

In August 2023, a briefing document “Report on the outcomes of the international expert mission ARTEMIS to review the national policy and national programme for the management of spent nuclear fuel and radioactive waste in the SR held from 12 to 22 February 2023 in Bratislava“, was submitted to the Government meeting, which took note of it. Currently the review process of the updated “National Programme for the Management of Spent Nuclear Fuel and Radioactive Waste in the SR“ is underway within the SEIA process at the Ministry of Environment. It is expected that the Government will approve the document at the beginning of 2025.

5. Review and approval of the safety documentation for the construction and operation of the 4th double row at the Mochovce repository submitted in June 2022:

Based on the progress made, the task is completed.

The safety documentation for the construction and operation of the 4th double row at the RÚ RAO Mochovce was submitted by JAVYS, a. s. for review by the ÚJD SR as part of its application for the building procedure in June 2022 and approved in November 2022. The safety documentation for the operation of the 4th double row of the RÚ RAO according to the Atomic Act will be approved by the end of 2025.

6. Provision for funding of institutional radioactive waste in the legislation:

Measure completed.

Current legislation provides for the obligation to post a financial guarantee for radioactive sources for activities related to the collection, sorting, storage, treatment, conditioning for disposal and

disposal. The obligation to pay the financial guarantee shall be borne by the applicant who will handle such a source. The financial guarantees shall be administered by the National Nuclear Fund. The calculation of the financial guarantee for a specific high-activity source shall be determined by an authorised organisation which is authorised to handle such source.

If the applicant for an authorisation submits together with the application for authorisation:

- a) a contract for the take-back of the high-activity source by its manufacturer or supplier,
- b) a contract for commercial insurance against the cost of disposing of the high-activity source due to insolvency at the time the source becomes a disused source or abandoned source; or
- c) a contract for the disposal of a high-activity source with a licence holder for the collection, sorting, storage, treatment, conditioning for disposal and disposal of radioactive waste at the time, when the source becomes a disused source,

the applicant does not have to pledge the financial guarantee with the NJF.

7. A strategy for institutional waste, which will be incorporated into the National Policy and National Programme for the Management of Spent Nuclear Fuel and Radioactive Waste in the SR, once the legislation is updated:

Based on the progress made, the task is completed.

In August 2023, a briefing document "Report on the outcomes of the international expert mission ARTEMIS to review the National Policy and National Programme for the Management of Spent Nuclear Fuel and Radioactive Waste in the SR held from 12 to 22 February 2023 in Bratislava", was submitted to the Government, which took note of it.

Strategy for the institutional radioactive waste was incorporated into the updated "National Programme for the Management of Spent Nuclear Fuel and Radioactive Waste in the SR", which is currently in the SEIA process. Once the process is completed, it is expected that the Slovak Government will approve the strategic document at the beginning of 2025.

In addition to the above topics it was agreed that all Parties would report at the next Review Meeting on the following:

8. The competencies and staffing associated with the schedule of spent fuel and radioactive waste management programmes:

The updated National Programme for the Management of Spent Nuclear Fuel and Radioactive Waste in the SR states that the implementation of activities in the field of back-end of the peaceful uses of nuclear energy, in particular the decommissioning and management of radioactive waste and spent nuclear fuel, as well as in supervisory activities of the state authorities requires highly

qualified staff, where the establishment of a sufficient training framework, whether in school curricula, vocational training of staff in specialized institutions or in the field of continuing life-long learning, is a prerequisite.

The importance of continuing education and training within the EU is emphasized both in the ratified Euratom Treaty (Article 33, which requires Member States to “lay down appropriate provisions, whether legislation, regulations or administrative measures, to ensure compliance with the basic standards, which have been laid down, and to take all necessary measures with regard to learning, education and training”) and in EC Directive 2011/70. The legislative framework in the Slovak Republic currently consists mainly of the requirements of Act No. 541/2004 Coll. (Atomic Act) and Act No. 87/2018 Coll. on Radiation Protection, and the relevant implementing regulations. The state-supported framework is complemented by the establishment of study programmes at universities in relevant disciplines.

On the other hand, however, the responsibility for the training of personnel carrying out the activities of the back-end cycle of the peaceful uses of nuclear energy, lies with the employers. The training of the staff of the operators of NIs respects the legislative requirements, and is planned and implemented in accordance with on-site plans, so as to ensure the continuous safe operation of the RAW and SNF management facilities, as well as decommissioning of NIs. Approximately 1,000 employees currently work in the back-end cycle of the nuclear power industry in Slovakia, the vast majority of them in JAVYS, a. s., providing for the decommissioning of nuclear facilities and waste management. Their training is provided by in-house trainings, courses and seminars, part of the vocational training is provided by the Training and Exercise Centre for the staff of NIs of VUJE, and postgraduate studies at universities. The participation of staff from various institutions in IAEA activities organised both at home and abroad also contributes to the development of expertise in an international context.

9. Inclusive public participation in radioactive waste management and spent fuel management programs:

The updated National Programme for the Management of Spent Nuclear Fuel and Radioactive Waste in the SR states that, in addition to the “polluter pays” principle, the system of financing of activities of the back-end cycle of the peaceful uses of nuclear power sector, is governed by the principles of proportionality, non-discrimination, transparency, cost-effectiveness, adequate recovery and sufficiency of resources.

The availability of information on the back-end of fuel cycle and SNF and RAW management is the first prerequisite for a discussion among all stakeholders on how to address these issues in the future. Continuity, clarity and openness of information are the main communication tools for all those responsible for the management of RAW and SNF.

The issue of transparency against the public is generally dealt with by the Government Plenipotentiary for the Development of Civil Society. A number of strategies have already been developed that need to be taken into account also in the back-end fuel cycle policy. For example, the Open Government Partnership underlines the application of the guiding principles -

transparency, participation and accountability of government to its citizens, as well as simple procedural rules and recommendations to increase public participation in public decision-making:

- 1. Promote a real and professional, not just formal discussion between state and NGO representatives.*
- 2. Develop an educational campaign, explaining open public debate as an integral part of democratic decision-making, as today debate is often perceived as a waste of time.*
- 3. Encourage systematic training of public officials to strengthen the motivation and skills of those who will lead participatory processes and involve public in decision-making.*
- 4. Encourage multi-sectoral participatory projects on specific issues.*
- 5. Establish or make operational advisory bodies, to which civic organisations or their platforms can delegate their representatives.*
- 6. Ensure that this voluntary activity is at least minimally covered by funding. The right to free access to information is regulated by Act No. 211/2000 Coll. on Free Access to Information (Freedom of Information Act). This law regulates the rules for the disclosure of information and the conditions of the right of free access to information in accordance with the relevant EU legislation.*

10. The ageing management of containers and facilities for radioactive waste and spent fuel taking into account extended storage periods:

In 2022, an IAEA IRRS Mission was conducted in Slovakia and based on it the experts identified, among other things, also the finding “Ensure the incorporation of the assessment of ageing management mechanisms into the authorisation process for packaging to transport nuclear and radioactive materials in accordance with IAEA safety standards (Specific Safety Requirements SSR-6 (Revision 1))”. In April 2024, the Government approved the document: Report on the results of IRRS Mission in the Slovak Republic in 2022, and the Action Plan to address the measures from the IRRS Mission. The Action Plan reflects the above-mentioned finding of the IRRS Mission, assigning responsibility to ÚJD SR and MD SR to address the finding by the deadline 30 September 2025.

Proposal for recognition of good practice in decommissioning.

Summary: The application of an immediate dismantling strategy combined with the treatment of all materials arising is considered to be outstanding. The integrated approach of JAVYS, a.s. and other participating organizations to the decommissioning project V1 effectively supported optimized execution of all technical activities in a timely and cost-effective manner. Furthermore, the openness of JAVYS, a.s in sharing their experience can be highly beneficial to a number of comparable present and future decommissioning projects. This good practice has been also recognized by the ARTEMIS mission which took place in 2023. More details can be found in Chapter K.

B Concept for Spent Nuclear Fuel Management (SNF) and Radioactive Waste Management (RAW)

Article 32 of the Joint Convention

1. In accordance with the provisions of Article 30 each Contracting Party shall submit a national report to each review meeting of Contracting Parties. This report shall address the measures taken to implement each of the obligations of the Convention. For each Contracting Party the report shall also address its:
 - i) *Spent fuel management policy;*
 - ii) *Spent fuel management practices;*
 - iii) *Radioactive waste management policy;*
 - iv) *Radioactive waste management practices;*
 - v) *Criteria used to define and categorize radioactive waste.*

B.1 Concept for Spent Nuclear Fuel Management

The basic concept of SNF and RAW management is determined by the National Policy and National Programme for Spent Fuel Management and Radioactive Waste Management in SR, *developed in accordance with Directive 2011/70/EURATOM and approved by Government Resolution No. 387/2015 of 8 July 2015. This document, containing both the National Policy and the National Programme, which is monitored and evaluated through annual reports, has been updated in the period 2020 to 2022, and is currently undergoing the SEIA. The updated document consisting of national policy, national framework and national programme sections with a new title “National Programme for Spent Nuclear Fuel Management and Radioactive Waste Management in the Slovak Republic” contains in the policy section separately for the area of SNF management and for the area of RAW management, the starting points, principles and main objectives, which are further elaborated in the national programme section, presenting the actual strategy and the actual programme for the management of SNF and RAW for the period up to 2030.*

The basic features of the current concept of SNF management in the SR can be summarised as follows:

1. Nuclear reactors operated in SR have open fuel cycle. Currently it is not possible to implement a closed fuel cycle, because the WWER-440 reactors in SR are not licensed to use reprocessed MOX fuel.
2. In the management of SNF, it is currently not considered to export SNF for reprocessing abroad with subsequent return of reprocessing products (Pu, U, high activity radioactive waste) back to the SR.
3. Short-term storage of SNF (3 - 7 years after its removal from the reactor) is at the reactors in spent fuel pools (“BSVP”), located at each reactor unit.
4. Long-term storage of SNF (50 years or more after its utilisation in the reactor) is in a separate storage facility for SNF at *Jaslovské Bohunice* site – Interim Spent Fuel Storage facility (ISFS).

5. The long-term goal in the concept of SNF management is to increase the capacity of the current ISFS for the needs of nuclear power plants in operation using dry storage.
6. At present, the priority path for the final management of SNF and RAW is the development of a *national* deep geological repository for the disposal of SNF and RAW not disposable at the RÚ RAO at Mochovce, and at the same time, as a fall-back option, the SR is pursuing activities that could lead to an international deep geological repository, i.e. a repository jointly owned and operated by several States based on the relevant international treaties.
7. Future decisions in the field of SNF management will reflect the technical and legislative development in this field in the European Union (EU) and in the world.

The ISFS in Jaslovské Bohunice (in operation since 1987) is used to store fuel assemblies in a pool filled with water (wet storage). After its reconstruction based on a change in the geometry of the fuel assembly storage arrangement, the ISFS currently has a *maximum* storage capacity (14,112 spent fuel assemblies, i.e. approximately 1,700 t of heavy metal). The refurbishment has also ensured higher seismic resistance and extended the operational lifetime of the ISFS to at least 50 years.

In order to ensure sufficient storage capacity for SNF at ISFS, the Project "Completion of storage capacity of SNF" has been implemented since 2017, the aim of which is to increase the capacity in the first phase by 10,115 pcs of SNF. The planned completion and commissioning of new storage capacities of the ISFS is expected at the beginning of 2024.

The entire production of SNF from the operation of the NPP A1 (reactor type HWGCR, in operation from 1973 to 1977) was shipped to the former USSR and subsequently to the RF until 1999. A small part of the SNF from VVER-440 reactors (697 fuel assemblies) was shipped to the former USSR still before 1987.

B.2 Concept for Radioactive Waste Management (RAW)

Characteristics of the current RAW management in the SR:

1. Maximum use of the existing technological facilities for the treatment and conditioning of RAW, which are built at the Jaslovské Bohunice and Mochovce sites - TSÚ RAO and FS KRAO.
2. The basic method of *treatment* of liquid RAW ("KRAO") is *the fixation of KRAO*, radioactive sludge and spent ion exchange resins into a form suitable for final disposal *using* cementation and fixation into SIAL (geopolymer) matrix *or incineration*. Bituminisation is no longer used due to the reduced production of liquid concentrates *and spent ion exchange resins from VVER Units in operation*.
3. The volume of solid RAW ("PRAO") is minimized in particular by their high pressure compacting, incineration and various preventive measures taken during operation and decommissioning of NIs.
4. Treated KRAO or PRAO as part of conditioning are placed into fibre-concrete containers ("FCC") covered with active sealing made of cement mixture and concentrates that are suitable for transport and storage, as well as for disposal in the National RAW Repository.

5. The treatment of intermediate level RAW or RAW with high trans-uranium content (specific KRAO from storage of spent fuel from NPP A1 as sludge and Chrompik – $K_2Cr_2O_7$) is provided for by vitrification technology.
6. Very low-activity RAW (“VLLW”) is disposed into the repository designed for this type of waste, which is built at the Mochovce site, within the premises of RÚ RAO. The first module of the repository for VLLW from the decommissioning of NPP A1 was put into operation in 06/2016. The second module of the repository for VLLW from the decommissioning of NPP V1 was put into operation in 12/2017.
7. Available technology (high pressure compacting, cementation, etc.) is used for treatment and conditioning of metal RAW. Low level metal waste is treated by fragmentation and decontamination, followed by release of decontaminated material into the environment. Due to an increase in metallic RAW that cannot be released into the environment, a Facility for melting metallic RAW *was built* for its treatment and further recovery, which was *put into* active operation in 2023.
8. Materials contaminated with radioactive materials meeting the criteria for release to the environment (in particular building materials) are separated and treated prior to release (by crushing) with subsequent use.
9. Institutional radioactive waste (hereinafter referred to as “IRAW”), disused sealed sources and radioactive materials of unknown origin (hereinafter referred to as “RMUO”) will be stored until their final treatment, conditioning and disposal in the Facility for the management of IRAW and ZRAM, which was built and put into operation in 02/2016 at the Mochovce site. *IRAW and RMUO containing nuclear materials are stored until their final treatment, conditioning and disposal, in dedicated areas of the Interim Spent Fuel Storage facility at the Jaslovské Bohunice site.* IRAW and RMUO are conditioned into a form suitable for permanent disposal, using standard technologies used for RAW from nuclear facilities.
10. Long-term storage of treated RAW (e.g. vitrified Chrompik) is provided in specially adapted facilities approved by the regulatory authorities.
11. Conditioned RAW from operation and decommissioning of NPP, as well as conditioned institutional RAW meeting the acceptance criteria are disposed at the RÚ RAO in Mochovce.
12. RAW that does not meet the criteria for disposal in RÚ RAO, is stored long-term at the site of nuclear power plants and in the Integral RAW storage facility at the Jaslovské Bohunice site, which was put into operation in February 2018.
13. RAW that does not meet criteria for disposal in the RÚ RAO, will be finally disposed of in the deep geological repository. Phase 1 of the development of the geological repository, Phase 2 - Part 1 of the selection of the deep geological repository site is now complete. In 2019, preparation for the Development Phase 2 - Part 2 was initiated.

14. RAW transports are carried out exclusively using approved transport equipment *and based on valid authorisations issued by the regulatory authorities.*
15. The costs of transport and management of RAW from the decommissioning of nuclear installations are covered mainly from the resources of the National Nuclear Fund. *The EU and other donors' funds allocated in the Bohunice International Decommissioning Support Fund ("BIDSF") or in the framework of the national pathway (SIEA) partially cover the RAW management of some of the decommissioning projects of NPP V1. The costs of transport and management of RAW and SNF from the operation of the NPP are covered by the operating costs of the RAW and SNF producers.*

In the updated "National Programme for the Management of Spent Nuclear Fuel and Radioactive Waste in the SR", which is expected to be approved by the Slovak Government in at the beginning of 2025, the RAW management strategy also includes data on financial costs and financing, including the final disposal of VLLW and LLW in the Mochovce repository, including the management of RAW that cannot be disposed of in this repository, based on the current and future needs determined by the ongoing decommissioning of the A1 NPP and the V1 NPP, in addition to the current operation of the units at Jaslovské Bohunice and Mochovce.

B.3 Criteria Used to Define and Classify Radioactive Waste

In the Slovak Republic (Act No. 541/2004 Coll. (Atomic Act)), RAW is defined as any unusable material in gaseous, liquid or solid form which cannot be released into the environment because of its radionuclide content or level of radionuclide contamination.

Release levels allowing the release of radioactive materials into the environment are laid down in Act No. 87/2018 Coll. on Radiation Protection.

The RAW classification (pursuant to the IAEA document GSG-1) is based on their activity and is defined in Section 5 of the ÚJD SR Decree no. 30/2012, establishing details of requirements for the management of nuclear materials, radioactive waste and spent nuclear fuel as amended ("ÚJD SR Decree No. 30/2012"):

- a) **transient radioactive wastes**, whose activity during storage, due to the very short half-life, falls below the *release levels* for their introduction into the environment,
- b) **very low-level radioactive waste**, whose activity is slightly higher than the *release values* for their introduction to the environment, contain mainly radionuclides with a short half-life, or also a low concentration of radionuclides with a long half-life, and which during storage require a lower degree of isolation from the environment through a system of engineered barriers, as in the case of surface-type radioactive waste repositories,
- c) **low-level radioactive waste** ("LLRW"), whose average mass activity of long-lived radionuclides, in particular alpha-emitting radionuclides, is less than 400 Bq/g, whose maximum mass activity of long-lived radionuclides, in particular alpha-emitting radionuclides, is locally less than 4 000 Bq/g, which

Concept for Nuclear Fuel Management (SNF) and Radioactive Waste Management (RAW)

do not produce residual heat and which, after treatment, comply with the limits and conditions of safe operation for the surface type of RAW repository,

- d) **intermediate-level radioactive waste**, whose average mass activity of long-lived radionuclides, in particular alpha-emitting radionuclides, is equal to or greater than 400 Bq/g, may produce residual heat and the arrangements for its removal are lower than for high-level radioactive waste and, after treatment, do not meet the limits and conditions for safe operation for a surface disposal type of RAW repository,
- e) **high-level radioactive waste**, whose average mass activity of short- and long-lived radionuclides, in particular alpha-emitting radionuclides, exceeds the values established for low- and intermediate-level radioactive waste, are only disposed of in a deep repository type of RAW repository, and residual heat removal measures are a significant factor in the design of such repositories.

Matrix (according to INFCIRC/604/Rev.3)

Type of Liability	Long-term policy	Funding of Liabilities	Current practice/facilities	Planned facilities
Spent nuclear fuel	Two options: <i>national</i> deep repository (<i>prioritised solution</i>) or multinational resolution	From the resources of the National Nuclear Fund - see chap. F.2.2	Long-term storage in ISFS (Interim Spent (<i>nuclear</i>) Fuel Storage)	Dry storage facility, Deep geological repository
Fuel cycle waste	Geological / surface repository	From the resources of the National Nuclear Fund - see chap. F.2.2	Disposal of low-level RAW (National repository for low-level RAW)	Geological repository for high-activity RAW
Institutional waste	Storage facility in operation at Mochovce / Repository	Repatriation or financial guarantee	Storage facility in operation at Mochovce / Repository	Repository (with some exceptions)
Decommissioning Liabilities	Immediate continuous decommissioning	National Nuclear Fund + EU Funds	Immediate continuous decommissioning; Disposal for contaminated soil and building materials Mochovce; + Integral RAW Storage facility at J. Bohunice	
Disused sealed sources	Storage facility in operation			Disposal facility

Concept for Nuclear Fuel Management (SNF) and Radioactive Waste Management (RAW)

	at Mochovce / Repository	Repatriation or financial guarantee	Storage facility in operation at Mochovce	
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C Scope of Application of the Convention

Article 3 of the Joint Convention

1. This Convention shall apply to the safety of spent fuel management, when the spent fuel results from operation of civilian nuclear reactors. Spent fuel held at reprocessing facilities as part of a reprocessing activity is not covered in the scope of this Convention unless the Contracting Party declares reprocessing to be part of spent fuel management.
2. This Convention shall also apply to the safety of radioactive waste management when the radioactive waste results from civilian applications. However this Convention shall not apply to waste that contains only naturally occurring radioactive materials and that does not originate from the nuclear fuel cycle, unless it constitutes disused sealed source or it is declared as radioactive waste for the purposes of this Convention by the Contracting Party.
3. This Convention shall not apply to the safety of management of spent fuel or radioactive waste within military or defence programmes, unless declared as spent fuel or radioactive waste for the purposes of this Convention. However, this Convention shall apply to the safety of management of spent fuel or radioactive waste from military or defence programmes, if and when such materials are transferred permanently to and managed within exclusively civilian programmes.
4. This Convention shall also apply to discharges as provided for in Articles 4, 7,11,14, 24 and 26.

This Report provides information on the implementation of the Joint Convention for nuclear installations in the SR. The link between the chapters and the individual articles of the Joint Convention is shown in Table 1.

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C.1 Safety of Spent Nuclear Fuel Management (SNF) and Radioactive Waste Management (RAW)

The scope of this Report includes information on the safety of SNF management from nuclear power facilities, including the transport and inventory of SNF and on the safety of RAW management.

The most important facilities in terms of spent fuel management are listed in Annex I.

There are currently no facilities for reprocessing of SNF in the Slovak Republic, nor facilities for the management of high-level waste and other products (plutonium, uranium) from reprocessing of SNF. Reprocessing of SNF is not yet part of the concept for the management of SNF (see B.1). At present, no reprocessing of SNF produced at Slovak nuclear installations is carried out, even abroad, with the intention of returning the products to the Slovak Republic. The SNF from NPP A1 and part of the SNF from the production of VVER-440 reactors, which was shipped to the USSR/RF in the past, was shipped without the return of high-activity RAW and reprocessing products back to the Slovak Republic.

D Spent Nuclear Fuel Management and Radioactive Waste Management Facilities

Article 32 of the Joint Convention

2. This report shall also include:

- i) *A list of the spent fuel management facilities subject to this Convention, their location, main purpose and essential features;*
- ii) *An inventory of spent fuel that is subject to this Convention and that is being held in storage and of that which has been disposed of. This inventory shall contain a description of the material and, if available, give information on its mass and its total activity;*
- iii) *A list of the radioactive waste management facilities subject to this Convention, their location, main purpose and essential features;*
- iv) *An inventory of radioactive waste that is subject to this Convention that*
 - a) *Is being held in storage at radioactive waste management and nuclear fuel cycle facilities;*
 - b) *Has been disposed of; or*
 - c) *Has resulted from past practices;*

This inventory shall contain a description of the material and other appropriate information available, such as volume or mass, activity and specific radionuclides;
- v) *A list of nuclear facilities in the process of being decommissioned and the status of decommissioning activities at those facilities.*

D.1 List and Description of Spent Nuclear Fuel Management Facilities

D.1.1 Basic characteristics of the main facilities for spent nuclear fuel management at NPPs of VVER type

The main facilities include:

- Fuel charging machine (CM),
- Spent fuel storage pool,
- Spent fuel pool reserve grid,
- Spent fuel pool coverage,
- Transport channel sealing plate,
- Transport container pit,
- Transport container stands,
- Spent fuel transport container suspension,
- Inspection shaft,
- Sealed capsule for damaged fuel assemblies,
- Platform over transport container shaft,
- Service platform for spent fuel transport container in reactor hall,
- Stand under the spent fuel transport container,
- Overhead electric crane 250/32/2 t.

A detailed technical description of this equipment is found in the National Report of 2003.

Taking into account the overall concept of modernisation of the units and the safety improvement programmes at NPP Jaslovské Bohunice 1-4, and based on the analysis of some significant operational events, several modifications of the equipment of the transport-technological part (hereinafter referred to as "TTP") for the handling of SNF were carried out until 2002.

The most significant include:

- Modernization and reconstruction of electrical parts of TV-systems and system of fuel charging machine (automatic process control with options of manual, emergency and simulation mode of fuel charging machine).
- Supply and repair of system for operative hermeticity test of fuel cladding in reactor core – “Sipping in-core test”.
- Supply of a special semi-automatic manipulator for removal of foreign objects from reactor pressure vessel and reactor internals.
- Installation of remote electric control of spent fuel transport container suspension.
- Safety modification of TK C-30 container (“TK C-30”) navigation to universal nest.
- Supply of portable demi-water heater for TK C-30.

The main criterion of these modifications was to reduce the human factor in operational events, to increase the safety of the handling of SNF, the reliability of the plant, the operational safety of the TTP and of these units in general.

Additional equipment was also purchased for the Mochovce NPP to enable more efficient work to be carried out on the reactor during the outage:

- Equipment for detecting untight fuel assemblies “Sipping in core” was complemented with a flow activity analyser MAK-8. The device consists of a bell, which can be used to check the entire core, except fuel cells of control rods in 66 steps. The bell moves within the reactor core using a working rod of the fuel charging machine. Fuel cells of control rod are checked in hermeticity test of fuel cladding casings.
- *The In-Mast Sipping device is designed for quick checking of fuel assemblies for leakage when the reactor is shut down. The device evaluates the activity of gaseous fission products in a sample of gas from a single fuel assembly.*
- Equipment for removal of fallen objects from the core will be placed on the reactor dividing platform. From the control panel it is possible to detect a fallen object in the core by using TV system. A head with interchangeable tools can be used to capture such object and place it in a transport container.

D.1.2 Interim Spent Fuel Storage JAVYS, a. s. (ISFS)

BASIC TECHNICAL DATA OF ISFS - JAVYS, a. s.	
Maximal storage capacity	14 112 fuel assemblies
Available storage capacity as at 31/12/2023	14 046 fuel assemblies
Number of pools	3 operational + 1 back-up
Ground plan	45 m x 70 m
Total built up area	95 000 m ³
Extension possibilities	2 - 3 pools
Method of storage	KZ 48 baskets, T-13
Maximal temperature of pool water	50°C
Capacity of purification system of pool water	25 m ³ /h
Method of transportation of spent fuel	Rail wagons, TK C-30 containers
Pool size, length x width x depth	23,4 m x 8,4 m x 7,2 m
Number of baskets per pool	98 pcs of KZ-48 type

Table 2: Basic technical data for ISFS

ISFS is a NI used for *long-term* and safe storage of spent nuclear fuel from VVER-440 reactors. It is designed as a wet storage. It was commissioned in 1986 *and its active operation began in 1987*.

The ISFS is designed as a standalone building with no structural continuity with other objects of the *Jaslovské Bohunice* nuclear facilities. The building is divided into a container and storage part. The storage part consists of 4 storage pools, one pool as a back-up. The storage pools are connected by a transport channel. Each pool can be separated from the transport channel by hydro-locks. The transport channel is connected to the receiving and transfer shaft, also with the possibility of separation by hydro-locks. The SNF is stored in baskets located in the pools under water, which also serves as shielding and removes the residual heat from the spent fuel assemblies.



Fig. 1 Pool hall in ISFS

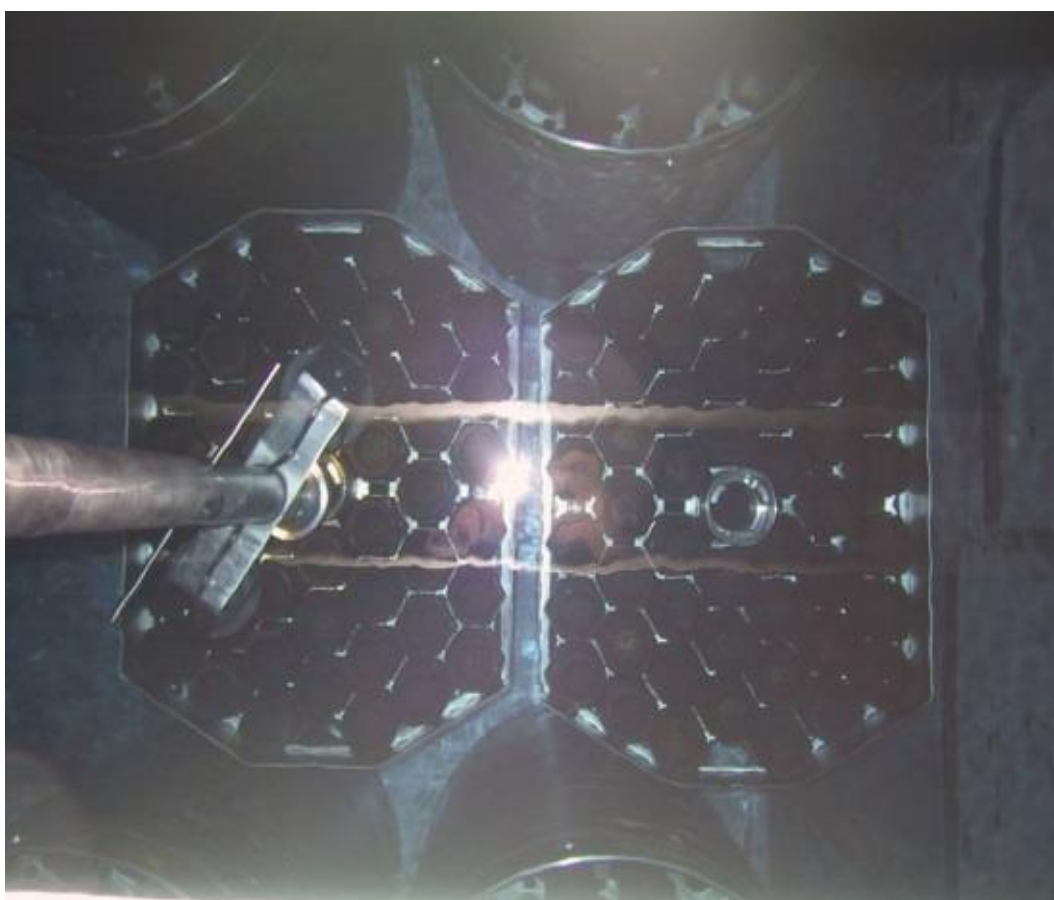


Fig. 2 Spent fuel cask

The pools are equipped with double lining (carbon steel and stainless steel) with an inter-space, from which organised leaks are diverted into organised leak system.

The ISFS was reconstructed in the period 1997 – 1999 to increase storage capacity, extend service life and seismically reinforce the building. The ISFS has its own **cooling and treatment station**. Due to the increased requirements for the removal of residual heat from the spent fuel (increased fuel burn-up, increased number of SNF) the original pool water cooling system was replaced by a new one. The overall storage capacity of ISFS after reconstruction and seismic reinforcement *was increased* from 5,040 pcs to a *maximal* 14,112 fuel assemblies).

Part of the reconstruction was a seismic reinforcement project of the ISFS, the aim of which was to increase the resistance of the building and technological structures. The implementation of this project has achieved a state that even after a seismic event all safety functions of the ISFS will be ensured up to the level specified for the Jaslovské Bohunice site (80 MSK 64) and its service life has been increased to at least 50 years *from the completion of the reconstruction of the ISFS*.

In addition to changes and modifications to the original structural design and technological equipment of the ISFS that resulted from the seismic reinforcement requirements and the expansion of the storage capacity, other changes and modifications were made that *increased the* technical and safety level of the ISFS, such as:

- Installation of the MAPP 400 spent fuel manipulator,
- Increasing the capacity of the A/C system of the control rooms, ventilation of the entrance to the ISFS, modifications to the HVAC system,
- increasing the capacity of the pool water filtration system with a filtration unit to capture micro-organisms in the pool water, including the disposal of filter cartridges,
- modification of the decontamination system,
- Installation of detection system for fuel assemblies tightness (Sipping in Pool) and monitoring of corrosion on the pool lining,
- modernisation of the ISFS radiation control system and instrumentation, etc.

Based on the recommendations resulting from the documents of the International Atomic Energy Agency (“IAEA”) [Document No. SSG-15 Storage of Spent Nuclear Fuel] and the ÚJD SR Decision No. 152/2000, a **monitoring programme** has been implemented since 2001 to monitor the condition of structural, technology parts and spent nuclear fuel (***program for monitoring ageing management of important technological equipment and systems***), focusing on the monitoring of the condition of:

- Building structures, such as the foundations of the ISFS building, concrete structures of spent fuel pools, supporting steel elements and structures, encasement of the ISFS building,
- Pressure vessels and piping systems (cooling, purification and decontamination system),
- Corrosive damage to equipment and technology that is in contact with the coolant for the spent fuel pools (construction of pools, transport equipment),
- Rotating machinery (selected pumps and fans),
- Power supply systems and components (transformers, generators, motors and wiring),
- Spent nuclear fuel.

Monitoring points were installed to monitor subsidence of the ISFS building, including monitoring of groundwater level. The condition of the lining of the ISFS pools is monitored by assessing the condition of samples of materials placed in the pools and by the acoustic emission method. A Sipping in Pool leak check is in place to monitor the condition of the fuel.

Periodic Safety Review of ISFS (PSR ISFS)

Since 2018, the periodic nuclear safety review ("PSR") has been ongoing. The review followed the legislation in force as at 30 November 2018. The emphasis of the review was placed on meeting of the requirements of the ÚJD SR Decree No. 33/2012 on periodical, comprehensive and systemic review of nuclear safety of nuclear installations as amended by the ÚJD SR Decree No. 106/2016 and the ÚJD SR Safety Guide.

Based on the PSR, 9 integrated corrective actions with low safety significance were proposed.

ISFS Stress Tests

In July 2011, ÚJD SR requested JAVYS, a. s., to prepare a similar analysis as for the NPPs, also for the ISFS. The following incidents have been considered:

1. An earthquake stronger than envisaged in the design basis,
2. Extreme floods beyond the design basis,
3. Other externalities that could cause loss of safety functions at the Jaslovské Bohunice site,
4. Extended period of complete loss of self-consumption of electricity,
5. Extended period of incapacity of residual heat removal,
6. Degradation in terms of cooling the spent fuel storage pools.

In 2012, JAVYS, a. s., realized – "ASSESSMENT OF THE ISFS RESPONSE TO FUKUSHIMA TYPE EVENTS". Based on this assessment, the document "Addressing failure conditions in ISFS" was updated in the scope of the chapter "Seismic event".



Fig. 3 Transport of TK C-30 by special transport hitch

Impact of V1 decommissioning on the operation of the ISFS

Due to the fact that the ISFS was connected with the parts of NPP V1 under decommissioning, modifications have been implemented on selected technological systems of the ISFS *within the project* of “Power Plant Modification and installation of new systems”.

The project dealt with the construction and modification of the following ISFS technological systems:

- Construction of demineralised water supply,
- Construction of a system for removal of low-activity contaminated and pool water,
- Installation of pipe connections for regeneration and decontamination solutions,
- Construction of a truck access gate *and* a new pumping station of the ISFS, etc.

The project "Power Plant Modifications (V1) and Installation of New Equipment" was completed in July 2022 after successful completion of active comprehensive tests and permits for permanent operation issued by the ÚJD SR.

Increasing SNF storage capacity in ISFS

As at 31 December 2023, 13,840 pcs of SNF were stored in ISFS, representing 98 % filled maximal design capacity of the facility. Due to the *gradual filling of the wet part of the ISFS*, an investment project “Increasing storage capacity for SNF at the Jaslovské Bohunice site” *has been implemented* since 2017, *the aim of which is to extent storage capacity in phase I by 10,115 pcs of SNF.*

The project implementation was preceded by the process of assessing the impacts of the proposed change on the environment (Act No. 24/2006 Coll.), which was completed by the issuance of the Final Opinion of the MŽP SR No.1604/2016-3.4/hp in 2016, with the recommended alternative of increasing the storage capacity with dry method, using storage containers (canisters) with a maximum of 85 pcs of SNF in reinforced-concrete storage modules. This method of storage uses the passive cooling of the SNF by natural air circulation. In 2022, inactive tests were performed on these packaging: crash, pressure and thermal test. At the time of preparation of the National Report, the project was in the final phase of its implementation, which includes active comprehensive testing of all delivered technological equipment and systems, which will be carried out after the issuance of the final ÚJD SR Decision in 2024.

Transport container C-30 is designed for on-site transportation from NPP V2 Units to the ISFS JAVYS, a. s., at the Jaslovské Bohunice site or off-site transport of SNF from NPP Mochovce Units. The transport container is transported on a special railway carriage. In the ISFS and HVB, the transport container's hinge is used to move it.

SNF placed in the KZ-48 basket, is transported in a container in a water environment with a nitrogen cushion (wet transport). The re-licensing process for the TK C-30 transport equipment for the period 2025-2029 is currently underway at the ÚJD SR.

D.2 List and Description of Facilities for Radioactive Waste Management

D.2.1 Radioactive Waste Management (RAW) Facilities at the NPP

VVER-440 NPPs are equipped with the following facilities for treatment and storage of RAW:

Solid RAW treatment facilities are: collection equipment, sorting equipment, washers, dryers, low-pressure compactor and fragmentation equipment. These are used for fragmentation of large-size metallic solid RAW.

Liquid RAW treatment facilities are: purification (filtration) stations with ion exchange resins (ŠOV 1, 4, 5 – single-block; ŠOV 2, 3, 6 - common), evaporating distillation equipment, treatment plant for contaminated oil, concentrate homogenization node and filling stations.

Gaseous RAW management facilities are: HVAC systems with filters to capture aerosols and iodine. During 2003 - 2004 replacement of original iodine filters of Soviet provenience with iodine filtration stations took place. As part of completion of the fragmenting workplace a new exhaustion system was installed for the workplace. Based on the decision of a state supervisory authority from 2011, the licensee for NPP V1 is no longer obliged to monitor noble gases and iodine-131 discharges since 2012 (NPP V1 is in a decommissioning phase after the definitive shutdown of operation and so these discharges are no longer formed).

Solid RAW Storage Facilities

The method of storing solid RAW depends on the type of RAW and from its packaging, e.g.:

- Solid RAW for incineration and high pressure compacting and metallic RAW for melting is stored in 200 litres MEVA drums in storage shafts,
- metallic solid RAW is stored in box pallets (only at NPP Jaslovské Bohunice 3,4 and NPP Mochovce),
- HVAC *filters are transported from the point of replacement in metal containers, wrapped in foil* and then placed in storage pits,
- Oversized solid RAW is freely stored in designated storage pits,
- and other.

Liquid RAW Storage Facilities are tanks for untreated *ion exchange resins and concentrates*. *Contaminated oils are always kept in double packaging: in jerry cans placed into MEVA drums. Sludge from the tanks can be temporarily stored in double packaging (drum in a tray) and solidified into a matrix – as needed – by a contractor (JAVYS, a.s.). Then handed over to a contractor (JAVYS,a.s.) as solid RAW for cementation.*

The concentrate is stored in stainless steel tanks with a capacity from 415 to 550 m³.

Used ion exchange resins are stored in stainless steel tanks with a capacity from 150 to 460 m³, which are placed in leak-proof concrete shafts capable of capturing the entire volume of the tank in case of any failure.

RAW from NPP operation is handed over for further treatment to JAVYS, a. s., responsible for RAW management in the SR up to its disposal.

D.2.2 Technology for Treatment and Conditioning of Radioactive Waste (TSÚ RAO)

Technologies for treatment and conditioning of RAW, located within JAVYS, a. s. premises at the Jaslovské Bohunice site include:

- Bohunice RAW Treatment Centre (“BSC“) consist of the following technologies for safe treatment and conditioning of RAW:
 - Solid RAW sorting,
 - Liquid RAW concentration,
 - Solid RAW and liquid RAW incineration,
 - High pressure compacting of solid RAW,
 - Liquid RAW and solid RAW cementation,
 - Storage and transport of solid RAW and liquid RAW

The final product is FCC with *cementation* treated RAW that comply with L&Cs for storage, transport and final disposal in the RÚ RAO;

- Bituminisation lines designed for treatment of concentrates and saturated sorbents;
- Discontinuous bituminisation line designed for treatment of saturated sorbents;
- Wastewater treatment plant used for treatment of liquid RAW from NPP A1;

- Fragmentation plant and large capacity decontamination plant for metallic RAW *intended for* decontamination and treatment of metallic RAW;
- Workplace for treatment of air filters;
- Workplace for crushing used power cables;
- Facility for melting metallic RAW;
- Fixed RAW pre-treatment facility.

The construction of a workplace for melting metallic RAW from the decommissioning of NPP A1 and NPP V1 within TSÚ RAO was launched after being approved by the ÚJD SR in 2017. The purpose of the melting facility is to minimise the produced metallic RAW from the decommissioning of NPP V1 and NPP A1. After successful testing, the melting plant was put into operation in 2021. The project was subject to EIA according to Act No. 24/2006 Coll. by issuing a positive final opinion of 2015 (see Chapter K.1)

After the *first* periodic nuclear safety review, the approval for the operation of TSU RAO was issued by ÚJD SR Decision No. 498/2010. In 2019, a repeated periodic nuclear safety review was performed with a reference date of 22 January 2019. Based on repeated PSR, two corrective actions were proposed of moderate safety significance, *which have been met by the authorization holder.*



Fig. 4 Bohunice Treatment Centre (BSC)

D.2.3 Facility for Final Treatment and Conditioning of Liquid RAW (FS KRAO)

FS KRAO is situated within the NPP Mochovce site, in the immediate vicinity of NPP Mochovce. It was put into operation in 2007 and consists of the following technologies for safe treatment and conditioning of RAW:

- Liquid RAW concentration,

- Bituminisation of concentrates,
- Bituminisation of saturated ion exchange resins (RA-sludge),
- Cementation of liquid RAW, *saturated ion exchange resins (RA-sludge)* and solid RAW,
- *Transport and handling equipment.*

Bituminisation technology is no longer used due to reduced production of liquid concentrates and saturated ion exchange resins from operating VVER Units.

The FS KRAO Mochovce facility is used for treatment and conditioning of liquid RAW in the following categories:

- Concentrates,
- Saturated ion exchange resins (RA-sludge),
- *and solid or solidified (fixed) RAW.*

The resulting product of *treatment* are FCCs with *cementation* treated RAW.

The first PSR of FS KRAO was conducted as at reference date of October 2015 after 8 years of operation. The PSR did not identify any safety significant difficulties.

D.2.4 Integral RAW Storage facility (IS RAO)

Within the activities of JAVYS, a. s., a NI was built at the Jaslovské Bohunice site *intended for storage of RAW* produced during decommissioning of NPP A1 and NPP V1. It is an Integral Radioactive Waste Storage facility, which is a nuclear installation according to the Atomic Act. *IS RAO* is located within the JAVYS, a. s. premises, at the Jaslovské Bohunice site, *and* was put into operation in 2017 by the ÚJD SR Decision No. 423/2017 with the expected date of closing its operation in 2087.

IS RAO is used for storage of the *following* RAW:

- Solid or solidified RAW before their further treatment in JAVYS, a. s., facilities
- *Solid or solidified* RAW until *their permanent final disposal*,
- *Solid or solidified* RAW for a period, during which their activity goes down to a level that they *can be* released into the environment.



Fig. 5 Integral Storage Facility for RAW

D.2.5 Facility for Institutional Radioactive Waste Management (IRAW) and Radioactive Materials of Unknown Origin (RMUO)

The Government of the Slovak Republic by its Resolution No. 610 of 2 September 2009 approved the proposed procedure for the management of IRAW and RMUO in the SR and mandated JAVYS, a. s., to build a comprehensive facility for collection, sorting and long-term safe storage of such materials.

The IRAW and RMUO management covers the following activities:

- collection,
- characterization,
- sorting,
- treatment,
- conditioning,
- storage,
- disposal.

A centralised facility for the safe storage of IRAW, RMUO produced in the whole SR until their further management was built at the Mochovce site and was put into operation in 02/2016. Subsequently, all IRAW stored until then in TSÚ RAO at Jaslovské Bohunice was transferred into the facility for IRAW and RMUO management.

D.2.6 Radioactive waste (RAW) transport facilities

To ensure the handling RAW, IRAW and RMUO, a transport system, including facilities, were created enabling the transport of:

1. Solid RAW and liquid RAW within the premises of Jaslovské Bohunice,
2. Solid RAW between Jaslovské Bohunice – Mochovce sites,
3. IRAW and RMUO from the whole SR to Jaslovské Bohunice, or Mochovce.

Transport of RAW is carried out in *approved* transport equipment on means of transport meeting the conditions of the European Agreement on the International Carriage of Dangerous Goods (ADR), or the Regulations for the International Carriage of Dangerous Goods by Rail (RID), Act No. 541/2004 Coll. (Atomic Act) and the ÚJD SR Decree No. 57/2006, establishing the details of requirements for the transport of radioactive materials (“ÚJD SR Decree No. 57/2006”).

The transports of RAW is fully *organised* by JAVYS, a. s.



Fig. 6 Transport of fibre-concrete containers to the National Repository of RAW



Fig. 7 Transport of solid RAW at Jaslovské Bohunice site and between Jaslovské Bohunice and Mochovce site



Fig. 8 Transport of KRAO at Jaslovské Bohunice site

D.2.7 National RAW Repository (RÚ RAO)

The National RAW Repository (put into operation in 2001) is a surface type repository, designed for the disposal of solid and solidified low- and very-low level RAW from the operation and decommissioning of nuclear installations in the SR. The repository site is located about 2 km north-west of the NPP Mochovce site.

The basic safety requirement for the repository is that there should be no release of radionuclides to the environment during operation, during and after institutional control, which would result in a radiation exposure higher than the values set by the applicable legal regulations.

The repository is built in a geological formation with low permeability and high sorption capacity *with engineering and geological barriers*.



Fig. 9 Third double row of boxes

The current disposal structures of the repository for disposal of VLW and LL RAW consists of three operational double rows of concrete boxes. Each of the double rows is divided into five expansion units. The double row consists of 40 boxes with a capacity of 90 FCCs per box. The total capacity of the existing LLW disposal structure at the RÚ RAO is 10,800 FCCs. Works are currently under way to provide additional disposal capacity for LLW. Since 2022, according to the ÚJD SR Decision No. 318/2022, the 4th double row is being built with the expected completion by the end of 2025 at the latest. The repository site allows for its expansion up to 7.5 disposal double rows, i.e. for the disposal of approx. 27 thousand FCCs of RAW.

The operation of RÚ RAO has been authorised by ÚJD SR Decision No.117/2019, by which the Authority authorised the operation of 1st, 2nd and 3rd double rows for disposal of low-level RAW and the part for the disposal of very-low level RAW, stage I and II.

The overlay for the filled third row and relocation of the hall over the fourth row of the VLLW repository in RÚ RAO Mochovce proceeds in accordance with the ÚJD SR Decision No. 122/2024.

In 2019, a repeated periodical nuclear safety review after 10 years of operation took place, with the reference date 14 September 2019. As a result of PSR, two corrective actions were proposed with low safety significance, with the deadline by the end of 2023, these were assessed by ÚJD SR and 2024 issued its Decision No. 212/2024. According to the conclusions from PSR of RÚ RAO the operation of RÚ RAO can be assessed as safe, with negligible impact on the environment.

For the disposal of very low-level radioactive waste, i.e. waste whose activity does not exceed the limits for its release into the environment (contaminated soils, crushed concrete from decommissioning), separate storage structures have been built in the southern part of the Mochovce RÚ RAO site for this category of RAW. In the period 2015 – 2016, phase 1 of the VLLW repository was completed with a capacity of 20,000 m³ VLLW produced in the decommissioning of NPP A1, and from 2017, also the 2nd phase of the VLLW repository is available. The total disposal capacity within phase 1 and 2 for VLLW, is currently 29,000 m³. *The implementation of the last, 3rd phase of the VLLW repository was postponed by the UJD SR Decision No. 325/2023 until the end of 2033, so that it would follow in time the activities related to the implementation of the 5th phase of decommissioning of NPP A1. The hall, which served for protection against weather conditions during the disposal of VLLW, was relocated and the first part of the final overlay was installed above the filled lanes of the deposited LLW.*



Fig. 10 Disposal of VLLW in the first stage of VLLW repository



Fig. 11 The 2nd stage of VLLW repository built next to the overlay hall of the operated 1st stage of the VLLW repository after its relocation in 2019

D.3 List and Description of Facilities in Decommissioning and Facilities for Radioactive Waste Management from Decommissioning, which are part thereof

D.3.1 NPP V1 Bohunice – In Decommissioning

Nuclear Power Plant V1 (NPP V1) is located in the Jaslovské Bohunice site.

NPP V1 had 2 pressurized water reactors of VVER-440/230 type. Unit 1 of NPP V1 was commissioning in December 1978 and Unit 2 in March 1980.

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

Following the removal of spent nuclear fuel from V1 NPP to the ISFS, based on the positive opinion of the EC in accordance with Article 37 of the Euratom Treaty, the UJD SR Decision No 400/2011 was issued for the 1st phase of decommissioning of this power plant, which entered into force on 20 July 2011.

The decommissioning of NPP V1 is being implemented in two phases.

The scope of work for the first phase of decommissioning (2011-2014) included the dismantling of equipment and removal of secondary circuit structures, i.e. outside the RCA of the nuclear power plant, which were not needed or suitable for further use. During this phase, the documentation necessary for

obtaining the authorisation for the 2nd phase of decommissioning of NPP V1. After the review of this documentation, the ÚJD SR issued its Decision No. 900/2014 containing the following:

- Authorisation for the 2nd phase of decommissioning of NPP V1;
- Authorisation for RAW management in the nuclear installation NPP V1;
- Authorisation for the management of nuclear materials in the nuclear installation NPP V1.

The activities of the 2nd phase of decommissioning of NPP V1 (2015 – 2027) are focused on dismantling of equipment and structures of the primary circuit, located in the RCA, i.e. decommissioning of the nuclear island. Other unnecessary external objects at NPP V1, tanks, underground piping ducts and cable lines will also be dismantled. Once the site has been restored to its original state (or remediated) and its final inspection has been carried out, the site will be released from the scope of the Atomic Act.

The decommissioning of NPP V1 is implemented through projects. Out of a total of 74 BIDSF projects, 5 projects are currently under implementation. The final project for the decontamination and demolition of NPP V1 buildings and restoration of the site to its original state is in the preparation phase. JAVYS, a. s., after obtaining an authorisation for decommissioning performs activities that represent irreversible changes to the Plant's technologies in the RCA areas of the main generating unit of NPP, such as the dismantling of large primary circuit components and dismantling of the most contaminated equipment (reactor pressure vessels from both Units, steam generators, main circulation water pumps, primary circuit pipelines and other technological components), as well as the implementation of other related projects. In parallel with the dismantling activities, there is a continuous process of management of the generated RAW, their transport and release of materials meeting the criteria for release into the environment.



Fig. 12 Transporting steam generator PG 11 to SO 490 V1

D.3.2 NPP A1 Jaslovské Bohunice – in Decommissioning

The nuclear power plant A1 (NPP A1) with heterogeneous reactor KS-150, was designed for an electrical output of 143 MWe. The fuel was natural metal uranium, the moderator was heavy water (D₂O) and the coolant was carbon dioxide (CO₂) - HWGCR.

The NPP A1 was connected to the power distribution network in December 1972. After an operational accident in January 1976 (first accident) the operation was restored, after another operational accident in February 1977, technical, economical and safety analyses were conducted and based on their results, in 1979 the Government with its Resolution No. 135/79 decided not to continue in operation of NPPA1.

Activities towards the decommissioning of NPP A1 have been initiated. Due to the absence of legislation for decommissioning of nuclear power plants at that time, sub-issues were dealt with on a case-by-case basis and individual activities were approved as modifications with an impact on nuclear safety. The work focused on:

- Removal of consequences of the operational event,
- Preparation of fuel shipment to USSR/RF,
- development and subsequent implementation of RAW management technology.

The first comprehensive documentation for the decommissioning of NPP A1 was prepared in 1992. The concept and schedule for decommissioning of NPP A1, which is in force today, was adopted by the Government Resolution No.227/92. By Government Resolutions Nos. 266/93, 524/93, 877/94 and 649/95, this schedule, including a comprehensive procedure was approved. **Updated documentation for the initial stage of decommissioning** was elaborated during 1994 - 1996. Based on the then valid Act No. 130/1998 Coll. on the peaceful uses of nuclear energy, following the assessment of the safety report elaborated in 1996, and after the completion of repatriation of fuel to the RF in 1999, ÚJD SR issued its Decision No. 137/1999 for the **1st phase of decommissioning**, i.e. to achieve the state declared in the mentioned documentation from the current initial state:

- all spent nuclear fuel has been removed from the long-term storage facility and media representing the highest potential risk have been solidified or transferred to new tanks,
- most of the liquid RAW from operation has been treated or is safely stored.

On 18 June 2009, the ÚJD SR Decision No. 178/2009 was issued authorizing the 2nd phase of decommissioning of NPP A1 in accordance with the Plan for the 2nd phase of Decommissioning of NPP A1, which enabled continuous alternative in the process of decommissioning of NPP A1. The following period was mainly focused on the decommissioning of the external facilities of NPP A1, the issue of contaminated soil management and RAW management from the main production unit of NPP A1.

The current state of NPP A1 can be characterised as follows:

- Export of spent nuclear fuel to the RF was completed in 1999 (based on an inter-governmental agreement from 1956),
- Medium for after-cooling of spent nuclear fuel: Chrompik (aqueous solution of chromium and potassium dichromate - K₂Cr₂O₇) is continuously vitrified, sludge in sleeves and sludge at the

bottom of the pool for long-term storage is solidified into geo-polymers, Dowtherm (an organic liquid mixture of diphenyl and diphenyl-oxide – originally coolant for fuel cells) was purified and incinerated or fixed into geo-polymer matrix. More than 99 % of water activity of the long-term storage pool was captured on special sorbents. The aqueous phase from the long-term storage pool was processed by concentration on the evaporator. The bottom sediments were transferred to a new storage tank.

- Liquid operational waste (concentrates) were bituminised, liquid waste from decommissioning of NPP A1, together with other waste from the Jaslovské Bohunice site are gradually treated, conditioned and disposed at the repository,
- Storage of solid RAW, object 44/20, was reconstructed, waste removed, sorted and stored in a controlled manner. Part of these RAW has been treated, conditioned and disposed,
- the original, non-operational storage tanks of Building 41, which posed the greatest potential risk for the environment, were decontaminated and removed.

Since 1 October 2016, phase III and IV of the decommissioning phase of NPP A1 is underway, the implementation of which was authorized by the ÚJD SR Decision No. 369/2016. These phases focus on the main generating unit, mainly on decommissioning of the technological equipment of the primary circuit, oil management and accessories to turbo-compressors, CO₂ cooling system, heavy water management, fuel cladding inspection system, steam generators, including their accessories, treatment of sludge phases from the long-term storage of SNF of A1, treatment of Chrompik, which was used as coolant for the SNF and treatment of cases from the storage of SNF from NPP A1. The decommissioning activities of the gas management facility, liquid RAW storage facility including external tanks, treatment of sludge phases from external tanks, handling of contaminated soils and groundwater remediation are continuing at the external facilities of NPP A1 during the next phases.

The planned completion date for phases III and IV of decommissioning of NPP A1 is 2024.

Preparations for the Phase V of NPP A1 decommissioning are currently underway, within which the environmental impact assessment was elaborated in accordance with Act No 24/2006 Coll. - Phase V of the decommissioning of NPP A1 and the subsequent release of the NPP A1 site from administrative control will be done and the characterisation of the premises, equipment and technological systems included in Phase V of the NPP A1 was carried out.

The document General Data according to Annex III of the Commission Recommendation for the application of Article 37 of the Euratom Treaty 'Phase V of the decommissioning of NPP A1 and the subsequent release of the NPP A1 site from administrative control' has been submitted to EC.

The end of phase V of the decommissioning of NPP A1 is expected by the end of 2033.

D.3.3 Facilities for the management of radioactive waste from decommissioning – part of NPP A1

Currently, the RAW is collected, sorted and stored in 200 dm³ drums. Burnable RAW is transported to the BSC incinerator. The sorting plant is used to sort the solid RAW (from the operation of NPP A1

compressed into bales) into burnable, non-burnable compressible and metallic. The decommissioning RAW management sites are equipped with different technologies.

Contaminated concrete (PNKB) Handling Facility

The workplace consists of PNKB containment, in which large parts of concrete blocks are progressively decontaminated in an abrasive manner.

Chrompik vitrification facility (VICHR)

The vitrification facility was built and is used for the fixation of radioactive medium Chrompik with the radioactivity of 10^{11}Bq/dm^3 , which was originally used as coolant for storage of SNF from A1. This high temperature process of treatment of liquid radioactive medium into glass matrix of borosilicate type is to achieve a significant volume reduction of RAW, while achieving the required quality parameters for leachability and stability of the matrix to achieve maximum safety during storage and later disposal of this specific radioactive liquid waste.

Handling box to handle intermediate level radioactive materials originally served as a hot cell for the inspection and handling of SNF from A1. After the reconstruction of the hot cell facility into a handling box, it is possible to use remotely controlled devices from the control room to carry out:

- cutting materials and sampling,
- clamping and machining of highly contaminated materials,
- handling samples (insertion, removal from containers),
- detailed visual inspection of objects,
- taking photos of objects;

Fragmentation plant for cases from long-term storage was built in order to dispose of cases for the long-term storage of SNF from A1, which remained in this NI after the SNF was shipped back to the Russian Federation. These cases for long-term storage are considerably contaminated from the inside and outside by radioactive substances and the dose rate of these cases reaches the order of 100 mSv/h.

The fragmentation workplace for cases of long-term storage allows:

- fragment the metal parts of the cases for long-term storage without internal contents,
- inserting fragments into empty barrels or shielded 200 l barrels (shielding of pre-concrete reinforced barrels and barrels with steel insert),
- measuring the dose rate on the drum surface and overall activity in the drum,
- performing inner rinsing of scissors, knives, working chamber, filling and discharging head,
- capture rinse medium in holding tanks,
- placing the lid on the drum and putting the drum into transport container.

Sludge fixation facility SUZA II

The facility is located in the reactor hall of NPP A1 and is used for fixation of sludge phases from the long-term storage pool for SNF of NPP A1. A cement matrix is used to fix the sludge, and the output product is a 200 dm^3 drum with fixed liquid radioactive waste (hereinafter referred to as "KRAO").

The facility, after certain adjustments, allows modification in the use of matrices, as well as the output product to 200 dm³ and 60 dm³ drums.

D.3.4 Mobile Facility for Radioactive Waste Management

Facility for sludge fixation. This facility located in ISO containers and relocatable **according** to the decommissioning needs, was commissioned in 2007 and it enables fixing RA sludge with specific beta, gamma activity of approx. 10⁹ Bq.kg⁻¹ into a cement matrix. Currently it treats bottom sediments, concentrated from all external tanks of NPP A1.

Workplace for sorting contaminated soil is an autonomous technology, transportable by regular means of transport; requires power supply. It comprises of 4 functional mutually linked units:

- Preparation of soils,
- Transportation of soils for monitoring,
- Monitoring and sorting of soils,

Shipment of soils after monitoring and sorting from the workplace.

Mobile decontamination circuits have been designed and manufactured to decontaminate some equipment such as tanks, pipelines and others. These devices consist of several modules that are interconnected and allow the pre-decontamination of equipment and piping routes to be carried out in a closed hydrodynamic circuit. Decontamination is carried out using decontamination solutions.

D.4 Inventory of Spent Nuclear Fuel and Radioactive Waste

The inventory of SNF and RAW is given in Annexes IV and V.

E Legislation and Regulation

E.1 Legislative and Regulatory Framework

Article 18 of the Joint Convention

Implementing Measures

Each Contracting Party shall take, within the framework of its national law, the legislative, regulatory and administrative measures and other steps necessary for implementing its obligations under this Convention.

Article 19 of the Joint Convention

Legislative and Regulatory Framework

1. *Each Contracting Party shall establish and maintain a legislative and regulatory framework to govern the safety of spent fuel and radioactive waste management.*
1. *This legislative and regulatory framework shall provide for:*
 - i) *The establishment of applicable national safety requirements and regulations for radiation safety;*
 - ii) *A system of licensing of spent fuel and radioactive waste management activities;*
 - iii) *A system of prohibition of the operation of a spent fuel or radioactive waste management facility without a licence;*
 - iv) *A system of appropriate institutional control, regulatory inspection, documentation and reporting;*
 - v) *The enforcement of applicable regulations and of the terms of the licence;*
 - vi) *A clear allocation of responsibilities of the bodies involved in the different steps of spent fuel and radioactive waste management.*
2. *When considering whether to regulate radioactive materials as radioactive waste, Contracting Parties shall take due account of the objectives of this Convention.*

E.1.1 Structure of the regulatory bodies

Oversight of the peaceful uses of nuclear energy is exercised by governmental authorities and organisations within the framework of their competence as laid down in the relevant laws, according to the scheme shown in Fig. 13.

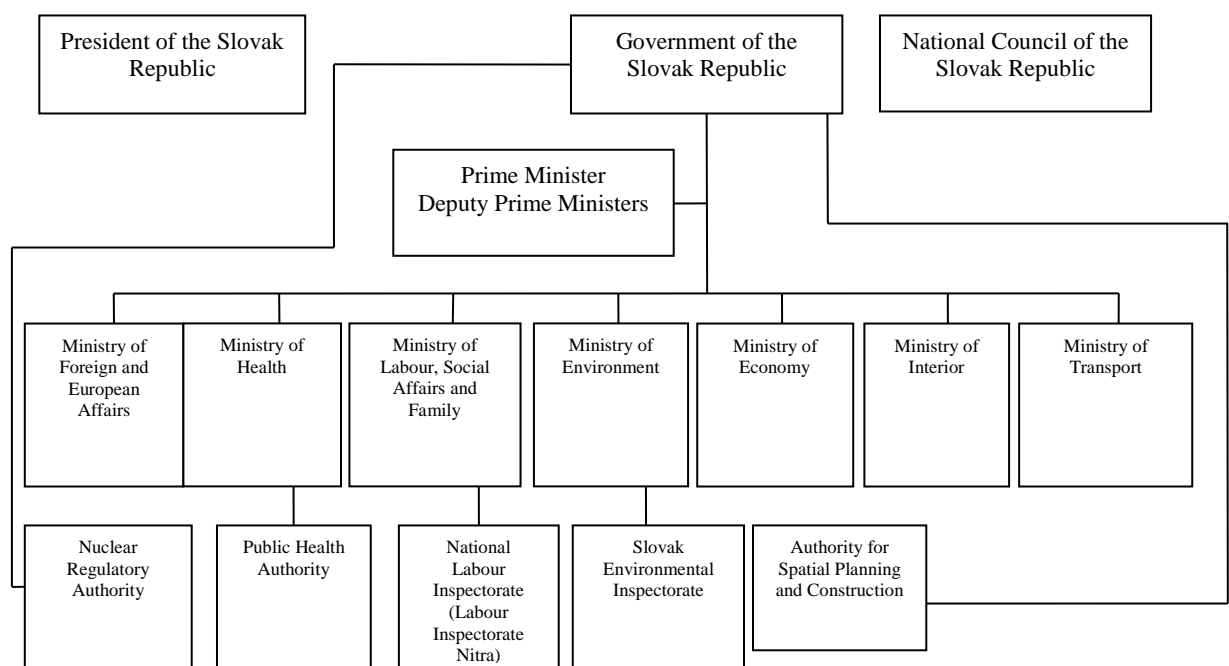


Fig. 13 Structure of regulatory bodies**Nuclear Regulatory Authority of the Slovak Republic (ÚJD SR)**

The ÚJD SR is the central state administration body for nuclear supervision. The ÚJD SR ensures the exercise of state supervision over the nuclear safety of nuclear installations, including the management of RAW and SNF and other phases of the fuel cycle, over nuclear materials, including their control and registration, as well as over the physical protection of nuclear installations and nuclear materials provided by the holder of the relevant licence. It ensures the assessment of the intentions of the nuclear energy uses programme and the quality of classified equipment and devices and the obligations of the Slovak Republic under international treaties relating to the nuclear safety of nuclear installations and the handling of nuclear materials.

Ministry of Health of the Slovak Republic (MZ SR)

MZ SR is the central authority of the state administration for health care and health protection. It carries out the state administration in the field of public health pursuant to Act No. 355/2007 Coll. on the protection, promotion and development of public health and on amendments to certain laws. The state administration in the field of radiation protection is carried out by the MZ SR pursuant to Act No. 87/2018 Coll. on radiation protection. The competence of the MZ SR includes, in accordance with current scientific knowledge on the impact of physical, chemical and biological factors on public health, the establishment of limits and values of the permissible burden of these factors, determines the fundamental directions and priorities in the field of radiation protection in the provision and delivery of health care to the population affected by a radiation accident, and ensures, within the scope of its competence, the training of responders in the field of radiation protection by health care providers.

Public Health Authority of the Slovak Republic (ÚVZ SR)

ÚVZ SR is a state budget organisation with its seat in Bratislava, with nationwide competence. ÚVZ SR ensures the performance of supervisory and regulatory functions in the field of radiation protection, and is the contact point for communication with the competent authorities of other Member States in the field of radiation protection, it participates in addressing national and international programs important for radiation protection. ÚVZ SR performs state supervision over activities leading to exposure, including SNF and RAW management and release of radioactive substances and radioactively contaminated facilities from administrative control. It determines the conditions and authorized limits in nuclear facilities and at workplaces, where it has issued a permit for operation. ÚVZ SR has the function of headquarters of the radiation monitoring network and manages its activity, monitors the radiation situation, gathers and processes data on monitoring results in the Slovak Republic for exposure assessments and assessments of the impact of radiation on the health of the population. ÚVZ SR determines reference levels for optimization of exposure in an emergency situation or in case of persistent exposure in an existing exposure situation and determines the conditions for the transition from an emergency to an existing exposure situation.

Ministry of Environment of the Slovak Republic (MŽP SR)

The MŽP SR is the central body of state administration (among others) for the creation and protection of the environment. Its subordinate organisations are:

- The Slovak Environmental Inspectorate, through which the MŽP SR performs the function of the main state supervisory body for environmental issues.
- Slovak Hydro-meteorological Institute, and others.

MŽP SR provides, inter alia, the assessment process of strategic documents carried out also under the Protocol on Strategic Environmental Assessment, in conformity with the Convention on the Assessment of Environmental Impacts in a Transboundary Context (Notification by the Ministry of Foreign Affairs of the SR No. 439/2010), also in accordance with the Convention on the Assessment of Environmental Impacts in a Transboundary Context (Notification by the Ministry of Foreign Affairs of the SR No. 162/2000) (Espoo Convention). MŽP SR under the Act governs also the procedure on assessment of anticipated impacts on the environment of proposed activities before deciding about their siting or prior to their authorization pursuant to special regulations in accordance with the Directive 2011/92/EU of 13 December 2011 on the Assessment of the Effects of Certain Public and Private Projects on the Environment and under the Espoo Convention. The aim of this procedure is to provide high level environmental protection, including health aspects:

- a) Ensuring that environmental considerations, including health considerations are thoroughly taken into account in the development of policies and legislation;
- b) Setting clear, transparent and effective procedures for strategic environmental assessment;
- c) Ensuring participation of the public on strategic environmental assessment; and
- d) Through this, by subsequent integration of environmental aspects, including health aspects, into measures and instruments proposed for promoting sustainable development.

Ministry of Interior of the Slovak Republic (MV SR)

The MV SR is a central state administration authority for, amongst others, the conceptual management and control of fire prevention, the preparation of an integrated rescue system including civil protection of the population and property, public order and personal security. In case of accidents at a nuclear installation, it is involved in management and carrying out rescue works, organizes and provides for the operation of the notification and warning centre of the Slovak Republic, development, operation and maintenance of information systems for collection of radiation data, operation of the integrated meteorological system, etc. It provides for a 24 hours permanent service, which fulfils the role of the national contact point of the Slovak Republic vis-à-vis the International Atomic Energy Agency in Vienna, competent body of the European Commission (ECURIE) in Luxembourg, contact point of the Emergency Response Coordination Centre (ERCC) of the European Union and of neighbouring States.

Ministry of Economy of the Slovak Republic (MH SR)

The MH SR is a central state administration authority for, amongst others, nuclear energy industry, including the management of nuclear fuel, storage of radioactive waste, prospecting and exploration of radioactive raw materials and their extraction.

Ministry of Labour, Social Affairs and Family of the Slovak Republic (MPSVR SR)

The MPSVR SR is a central government authority (among others) for occupational health and safety and labour inspection. The state administration in the field of labour inspection is performed by the state administration bodies: the MPSVR SR, the National Labour Inspectorate and regional labour inspectorates.

The MPSVR SR oversees and controls the National Labour Inspectorate and is responsible for the execution of labour inspection. The National Labour Inspectorate is a superior authority of the Labour Inspectorate Nitra, which supervises the observance of legal regulations and other regulations to ensure occupational health and safety at workplaces of nuclear installations, with competence over the whole Slovak Republic (Section 7 (1) of Act No. 125/2006 Coll. on Labour Inspection).

Ministry of Transport of the Slovak Republic (MD SR) and Health Officer Department (ÚVHR)

The MD SR is the central state administration body for railway, road, water and air transport, electronic communications *and* postal services. In terms of shipments of fresh and spent nuclear fuel and RAW, the MD SR is one of the authorities involved in the authorisation process. Pursuant to Section 28 (15) (c) of Act No. 541/2004 Coll. (Atomic Act), the MD SR approves the emergency transport schedule, containing measures during incident or accident during the transport of radioactive materials, *in the form of Minister's Decision on the approval of the emergency schedule in question.*

The MD SR is also the radiation protection authority pursuant to Section 4 (1) (d) of the Act No. 87/2018 Coll. on radiation protection. It exercises its competencies in the field of radiation protection in railway, road, waterway and air transport in accordance with Sections 8 and 9 of the Act No. 87/2018 Coll. on radiation protection. The Health Officer Department (ÚVHR) enforces the requirements of the law on radiation protection in the conditions of the Transport Ministry. *Within its competence, the ÚVHR MD SR – in the field of nuclear energy uses – issues authorisations for shipments of fresh and spent nuclear fuel, and determines the conditions for the performance of these activities, exercises state health supervision over radiation protection during transport pursuant to Act No. 87/2018 Coll..*

Authority for Spatial Planning and Construction of the Slovak Republic (ÚpÚPaV SR)

The ÚpÚPaV SR is the other central government authority for spatial planning, except for ecological aspects, construction and expropriation. In the field of spatial planning, the ÚpÚPaV SR procures, discusses and submits to the Government for approval the assignment and draft of the Concept of Spatial Development of Slovakia and the draft of amendments and supplements to the Concept of Spatial Development of Slovakia, and once every four years prepares a report on the status of the Concept of Spatial Development, acquires spatial planning documents for the acquisition and processing of the Concept of Spatial Development of Slovakia, monitors the topicality of the Concept of

Spatial Development of Slovakia and, when carrying out activities under point (a), cooperates with the competent environmental impact assessment body in proceedings under the Act on Environmental Impact Assessment. The ÚpÚPaV SR cooperates with the ministries and other central bodies of state administration in developing sectoral concepts, programmes and other strategic documents, having impact on the territory, and ensures that the Concept of Spatial Development and the Concept of Spatial Development of Regions are taken into account.

E.1.2 Legislation

E.1.2.1 Introduction

The legal structure for regulation of the nuclear safety consists of laws, which were reviewed in the period of Slovakia's accession to the European Union and shortly after the accession. During this period, *binding acts of the European Community and EU law were transposed into the legal order of the Slovak Republic. Some legislation is valid and in force still from the period before EU accession (e.g. Act No. 50/1976 Coll. (Building Act) – a new Building Act or its amendment is currently being prepared).*

The legal system of the Slovak Republic is structured as follows:

1. The basic law of the state is the Constitution of the Slovak Republic (No. 460/1992 Coll.) and is approved by the National Council of the Slovak Republic by at least a 3/5 majority of all members – is generally binding.
2. Constitutional laws – also adopted by the National Council of the Slovak Republic, at least by 3/5 majority of all members – are generally binding.
3. Basic rights and duties are enshrined in laws that specify principles *and rules* in various areas and are approved by simple majority of members of the National Council of the Slovak Republic – are generally binding.
4. *Government regulations are issued by the Government. Government regulations may not impose obligations, amend or supplement legislation beyond the scope of the law or regulate social relations not regulated by the law; this does not apply if it is a Government regulation pursuant to Article 120(2) of the Constitution (hereinafter referred to as an "approximation regulation of the Government"), which transposes or implements legal acts or international treaties.*
5. *Decrees and measures are legal regulations issued by central government bodies to be promulgated in the Collection of Laws; this designation may not be applied to regulations which are not of general binding force.*

E.1.2.2 Acts in the field of state supervision

The use of nuclear energy is governed by **Act No. 541/2004 Coll.** (Atomic Act), which came into force on 1 December 2004 and repealed the original Act No. 130/1998 Coll. on peaceful uses of nuclear energy and on amendments to Act No. 174/1968 Coll. on state supervision over occupational safety as

amended by Act of the National Council of SR No. 256/1994 Coll., as well as all implementing decrees. Act No. 541/2004 Coll. (Atomic Act) has been amended twenty-eight times since its entry into force.

The Atomic Act establishes conditions for the safe use of nuclear energy exclusively for peaceful purposes in accordance with international treaties concluded by the Slovak Republic.

The licensee is liable for nuclear damage caused by each individual nuclear event:

- a) Nuclear installation with a nuclear reactor or nuclear reactors for energy purposes during commissioning and during operation up to EUR 300,000,000;
- b) Other nuclear installations during commissioning and during operation, transport of radioactive materials and all nuclear installations in the decommissioning stage up to EUR 185,000,000.

Pursuant to the Atomic Act (No.541/2004Coll.) a nuclear installation is considered to be a set of civil structures and necessary technological equipment in a configuration determined by the design and intended for:

1. power generation or nuclear energy research involving a nuclear reactor or nuclear reactors which will use, do use or have used controlled fission chain reactions,
2. the management of nuclear materials with a quantity greater than one effective kg, except for storage areas for containers and shelters in which nuclear material is used as shielding material for radioactive sources, facilities for treatment of uranium ore and storage of uranium yellowcake,
3. management of spent nuclear fuel,
4. RAW management; or
5. Uranium enrichment or fabrication of nuclear fuel.

Act No. 308/2018 Coll. repealed *and replaced the* original Act No. 238/2006 Coll. on the National Nuclear Fund for the Decommissioning of Nuclear Installations and for the Management of Spent Nuclear Fuel and Radioactive Waste (the Nuclear Fund Act), and amended Act No. 541/2004 Coll. (Atomic Act) (Act No. 308/2018 Coll. on the National Nuclear Fund“). Act No. 308/2018 Coll. on the National Nuclear Fund transposing Council Directive 2011/70/Euratom of 19 July 2011, establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste (Council Directive 2011/70/Euratom establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste).

The Atomic Act was several times amended in the period of 2017 – 2024 for reasons connected with the transposition of EU legal instruments or by introducing a siting procedure of a nuclear installation, but only of a reactor type.

As a result, the authorisation for siting of NPPs is a two-step process. At first stage it is not necessary to submit documentation demonstrating the civil and structural design of the building, no decision is taken about siting specific buildings of nuclear sources. This is dealt with in the authorization process (zoning and building proceedings).

Civil liability for damage arising in causal connection with a nuclear incident is governed by the **Act No. 54/2015 Coll. on civil liability for nuclear damage and its financial coverage and on amendments to certain laws as amended by Act No. 363/2021 Coll.** and entered into force on 1 January 2016. It

establishes, inter alia, an amount of EUR 300 million as the limit of the financial liability of the operator for nuclear damage caused by a nuclear incident at a nuclear installation for energy purposes and an amount of EUR 185 million as the limit of the financial liability of the operator for other nuclear installations, transports of radioactive materials and nuclear installations undergoing decommissioning.

General binding implementing legislation related to Act No 541/2004 Coll. (Atomic Act), issued by the ÚJD SR in the form of decrees, is listed in Annex VI.

ÚJD SR also issues safety guides to explain and clarify requirements for certain activities or doc related to nuclear safety (Annex VI.).

Act No. 575/2001 Coll. on Organization of Governmental Activities and of Central State Administration (Act No. 575/2001 Coll. (Competence Act)) defines the framework of tasks and responsibilities of central state administration authorities. The part on the ÚJD SR is in Section 29 of the Act No. 575/2001 Coll. currently in force (Competence Act).

Act No. 251/2012 Coll. on the energy sector (Act No. 251/2012 Coll. on the Energy Sector), effective from 1 September 2012 repealed *and replaced* the original Act No. 656/2004 Coll. on the Energy Sector. Act No. 251/2012 Coll. on the Energy Sector, as one of the basic laws, regulates the conditions of doing business in the nuclear power industry in the Slovak Republic, as well as the rights and obligations of natural and legal persons doing business in this field and the exercise of state supervision and control over business in the power industry.

Act No. 250/2012 Coll. on regulation in network industries - regulates the subject matter, scope, conditions and method of regulation in the network industries. The electricity sector (electricity generation) is also understood to be a network industry. Activities carried out in the network industries are considered regulated activities for which authorisation by the Regulatory Office for Network Industries is required. The Act regulates the conditions for carrying out regulated activities and the rights and obligations of regulated entities and the rules for the functioning of the internal electricity and gas markets.

Act No. 24/2006 Coll. on environmental impacts assessment, effective from 1 February 2006 repealed and replaced the original Act No. 127/1994 Coll. on environmental impacts assessment. In order to ensure a high level of protection of the environment, the law establishes a procedure for professional and public assessment of anticipated impacts on the environment, namely:

1. strategic documents during their preparation and prior to their approval (e.g. concept of radioactive waste and spent nuclear fuel management, the national program for radioactive waste and spent nuclear fuel management); and
2. proposed activities before the decision on their siting or before permitting them according to special regulations (construction of nuclear installations and related activities).

Act No. 24/2006 Coll. on environmental impacts assessment defines activities subject to mandatory international environmental impacts assessment:

1. nuclear power plants and other nuclear reactors (excluding research installations for the production and conversion of fissile and enriched materials, the maximal thermal output of which does not exceed 1 kW of continuous thermal load),
2. facilities intended exclusively for the production or enrichment of nuclear fuel, for reprocessing of spent nuclear fuel or its storage, as well as for the disposal and treatment of RAW.

Since 2006, the Act No. 24/2006 Coll. on environmental impacts assessment was amended *twenty-seven times*. In 2009, it was amended by Act No. 287/2009 Coll. with the aim to:

- specify the procedure for changes in the proposed activities,
- clarify the procedure for deciding which of the activities not listed in the Annex to the Act are subject to assessment,
- regulate transboundary impacts assessment,
- inform the public after the decision was taken to authorise the proposed activity,
- position of the public in the process of environmental decision-making.

With effect from 1 May 2010, Act No. 24/2006 Coll. on Environmental Impacts Assessment was amended by Act No. 145/2010 Coll., amending also other laws, in particular Act No. 50/1976 Coll. (Building Act), and Act No. 541/2004 Coll. (Atomic Act), in public access to environmental information and in decision-making on authorising proposed activities. Following the amendment of Act No. 24/2006 Coll. on Environmental Impact Assessment in 2010, the public concerned has expanded to include natural persons and legal entities interested in environmental decision-making procedures. In the case of a natural person, the person must be over 18 years of age, who submits a written statement indicating that he or she has an interest in the decision and has the status of a party to the subsequent authorisation procedure. This amendment further regulates the concept of a citizens' initiative, as well as the way of acting, participating in the process and electing a proxy for this group of people. A citizens' initiative, as well as a civic association and a non-governmental organisation, shall have the status of a party to proceedings under a special provision, provided that the conditions laid down by law are met. *The last amendment was adopted by Act No. 272/2023 Coll. and entered into force on 1 April 2024. This amendment fundamentally changes the integrated procedures. An integrated procedure, for the purposes of this Act is a procedure, in which the impact assessment pursuant to Section 18 (1) or the screening procedure pursuant to Section 18 (2) and the permitting of a construction pursuant to the general construction regulation are combined in a single procedure, except for the construction of a nuclear installation and buildings related to a nuclear installation. On 13 February 2024, the National Council of the SR adopted Act No. 46/2024 Coll., amending Act No. 50/1976 Coll. on spatial planning and building regulations (Building Act), also amending other laws, entered into force on 31 March 2024 except for selected Articles. The above-mentioned Act postponed the effectiveness of the Construction Act to 1 April 2025. The effectiveness of Act No. 200/2022 Coll. on spatial planning remained unchanged, i.e. it is effective from 1 April 2024. In the same way this Act also entered into Act No. 272/2023 Coll. and modified some of the provisions in such a way that the part linked to the still effective Building Act is effective from 1 April 2024, and the remaining part, linked to the Construction Act, from 1 April 2025.*

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

Act No. 308/2018 Coll. on the National Nuclear Fund was adopted with effect from 1 January 2019, replacing the original Act No. 238/2006 Coll. on the National Nuclear Fund for the Decommissioning of Nuclear Installations and for the Management of Spent Nuclear Fuel and Radioactive Waste (Act on the Nuclear Fund). The Nuclear Fund is an independent legal entity, administered by the MH SR. The Fund has its own bodies (Board of Trustees, Supervisory Board, Director, Chief Controller). The sources of the Nuclear Fund are various - mandatory contributions from holders of licences for nuclear installations for electricity generation, mandatory payments from holders of licences for non-reactor nuclear installations, levies collected by transmission system and distribution system operators in the prices of electricity supplied directly from end-users (to cover the so-called "historical debt"), fines imposed by the ÚJD SR, interest on deposits, grants and contributions from EU funds, the state budget and others. The amount of the annual levy intended for the payment of the historical debt from the delivered electricity to end-users of electricity and the details on the method of its collection, its use and the method and terms of its payment are set out in Government Regulation No. 21/2019. The amount of the mandatory contribution and the mandatory payment and details on the method of collection and payment of the mandatory contribution and the mandatory payment are set out in Government Regulation No. 22/2019.

Act No. 87/2018 Coll. on radiation protection regulates the performance of state administration in the field of radiation protection, conditions for performing activities leading to exposure and activities in the environment with natural sources of radiation, requirements for management of radioactive substances, institutional radioactive waste and radioactive waste of unknown origin, protection of workers and residents from exposure to radon inside the buildings, external irradiation from building materials and persistent exposure resulting from an emergency or as a result of human activity in the past, ensuring the safety of radioactive source, preparedness for radiation emergency, monitoring of radiation situation and radiation monitoring network, limitation of exposure from drinking water, natural mineral water and spring water, obligations of natural persons and legal entities in ensuring radiation protection, offences, administrative offences and sanctions in the field of radiation protection.

The performance of activities and provision of services important from the point of radiation protection with regard to the extent of possible radiation hazard are divided into:

- activities that are excluded from the scope of law,
- activities subject to notification obligation,
- activities and services subject to registration; and
- activities and services performed on the basis of a permit.

The Act also defines the requirements for ensuring physical protection when using radioactive sources, which are to prevent misuse of radioactive sources for illegal manipulation, including the possibility of their misuse for terrorist purposes. Details on the requirements for ensuring radiation protection for the implementation of the law are set out in the implementing decrees of MZ SR listed in Annex VI.

Act No. 87/2018 Coll. on radiation protection was amended in 2023. This amendment is to meet the requirements defined in the Council Directive 2013/59/Euratom of 5 December 2013, laying down basic safety standards for protection against the dangers arising from ionising radiation, and is in line with the

requirements of the European Commission set out in the formal Communication C (2020) 6976 final on Act No. 87/2018 Coll. on Radiation Protection. The aim was to propose new transposition clauses into national law for specific provisions that the European Commission could not identify as fully transposed.

Act No. 125/2006 Coll. on labour inspection regulates labour inspection, through which the protection of employees at work and the exercise of state administration in the field of labour inspection is enforced, defines the competence of state administration bodies in the field of labour inspection, establishes the rights and obligations of the labour inspector and the obligations of a natural person and a legal person. The Act repealed and replaced Act No. 95/2000 Coll. on labour inspection and on amendments to certain laws as amended. The related generally binding legal regulations are in Annex VI.

Act No. 124/2006 Coll. on occupational health and safety establishes general principles of prevention and basic conditions for ensuring safety and health at work, for the elimination of risks and factors contributing to the occurrence of occupational accidents, occupational diseases and other damage to health from work. The safety of technical equipment is an integral part of occupational safety and health. The related generally binding legal regulations are in Annex VI.

With the amendment of **Act No. 50/1976 Coll.** (Building Act) by Act No. 541/2004 Coll. (Atomic Act) effective from 1 December 2004, the ÚJD SR became a special building authority for the construction of nuclear installations and buildings related to a nuclear installation, located on the premises of an NI. Before issuing a decision on the siting of a building concerning a construction involving a nuclear installation, the building authority is obliged to request a binding opinion of the ÚJD SR, which may condition its approval on the fulfilment of conditions. Act No. 279/2019 Coll., amending Act No. 541/2004 Coll. (Atomic Act) and Act No. 50/1976 Coll. (Building Act) entered into force on 1 October 2019.

A working group is created at the MD SR. It is expected that a new construction act or an amendment to the Construction Act will be prepared.

Act No. 364/2004 Coll. on waters laying down conditions for general protection of waters, including aquatic ecosystems, the maintenance or improvement of the status of waters, efficient, economical and sustainable use of waters.

E.1.2.3 Draft legislation

In 2013, preparations for a new atomic law began. A working group was set up in the ÚJD SR to prepare the new atomic law. Due to the transposition deadline (15 August 2017) for Council Directive 2014/87/Euratom amending Council Directive 2009/71/Euratom establishing a Community framework for the nuclear safety of nuclear installations and due to the large number of comments on the new atomic law, the ÚJD SR decided to prepare only an amendment to Act No. 541/2004 Coll. (the Atomic Act) for the transposition. Work on the new atomic law resumed in the second half of 2017. The reasons for the preparation of the new Atomic Act are the development of the legislation in the Slovak Republic over the last ten years and its new challenges, the implementation of the actions from the IRRS Mission 2012 Action Plan - e.g. the reduction of the number of decisions issued regarding changes at the NIs and the related increase in the inspection activity of the Authority, the change of ownership of the

operator, the enhancement of the access of the public concerned to environmental information, the access to justice and the application of the practical experience from the application of the existing Act No. 541/2004 Coll. (Atomic Act) (see chap. E.2.1.2), the new WENRA requirements, taking into account the new form of exercising public authority electronically (E-Government), cyber security, or tightening personal data protection. *Preparation of the accompanying documentation and development of an impact analyses according to the new Unified Methodology for the Assessment of Selected Impacts, most recently approved by the Government Resolution No. 479/2023 Coll. is currently under way.*

E.2 Regulatory Authorities

Article 20 of the Joint Convention

Regulatory body

1. *Each Contracting Party shall establish or designate a regulatory body entrusted with the implementation of the legislative and regulatory framework referred to in article 19, and provided with adequate authority, competence and financial and human resources to fulfil its assigned responsibilities.*
2. *Each Contracting Party, in accordance with its legislative and regulatory framework, shall take the appropriate steps to ensure the effective independence of the regulatory functions from other functions, where organizations are involved in both spent fuel or radioactive waste management and in their regulation.*

E.2.1 Regulation of Nuclear Safety

E.2.1.1 State regulation in the field of nuclear safety

The Nuclear Regulatory Authority of SR (ÚJD SR) was established on 1 January 1993 and its competencies arise from the Act No. 575/2001 Coll. (the Competence Act). ÚJD SR is an independent state regulatory authority that reports directly to the Government and is headed by the Chairperson appointed by the Government. The regulatory authority's independence from any other body or organization engaged in development or utilization of nuclear energy is applied in all relevant fields (legislation, human and financial resources, technical support, international cooperation, enforcement instruments).

In accordance with the Act No. 575/2001 Coll. (the Competence Act), ÚJD SR, inter alia, ensures the state regulation of nuclear safety at nuclear installations, including regulation of radioactive waste and spent fuel management and other phases of the fuel cycle, as well as of nuclear materials, including their control and record keeping.

The key piece of legislation in the field of nuclear safety is the Atomic Act. On the basis of this act, ÚJD SR decrees and decisions are prepared and issued. Besides the generally binding legal regulations, ÚJD SR issues also Safety Guides to assist licensees to meet the generally binding regulations (see Annex VI.). In the authorization procedure related to nuclear installation, standards and recommendations of the International Atomic Energy Agency are used and applied. The same way knowledge from the OECD/NEA and the European Union is applied.

Decision can be generally characterized as an act of the application of law. It means that it is the application of rights and obligations laid down in a generally binding legal provision in a particular case to a particular subject. Decisions issued by administration authorities are also referred to as individual

administrative acts. The obligations imposed by a decision are enforceable and the failure to perform them can be sanctioned. Decisions are in principle subject to the possibility of bringing an action to court for judicial review of the decision. However, the court does not review those decisions that are excluded from its jurisdiction under Section 7 of Act No. 162/2015 Coll. the Judicial Administrative Procedure – effective from 01 July 2016.

The ÚJD SR issues various types of decisions: on approval, on license, on authorization, on sanction or measure imposition, on the designation of a new licensee, on the verification of professional competency, on the documentation review and other.

The scope of powers of the ÚJD SR is enshrined in Section 4 of Act No. 541/2004 Coll. (Atomic Act) (<https://www.slov-lex.sk/pravne-predpisy/SK/ZZ/2004/541/20230701#paragraf-4>).

The ÚJD SR issues annual reports on the status of nuclear safety of nuclear installations and on its activities in the previous year. It presents the report once a year, always by 30 April, to the Government of SR and subsequently to the National Council of SR. The annual reports are available at <http://www.ujd.gov.sk>.

E.2.1.2 Nuclear Installation Authorisation Procedure

The authorisation procedure for nuclear installations has six main stages for reactor installations and five main stages for other nuclear installations: siting a nuclear installation under the Atomic Act (only for reactor installations), in parallel the siting of the nuclear installation is authorised under the Building Act, then its construction, commissioning, operation and decommissioning. Before granting an authorization for operation, the regulatory authority carries out inspection under the approved schedule of particular stages of nuclear installation commissioning (testing, fuel loading, physical start up, power testing, trial operation). The main supervisory authorities and the licensing process for issuing an operating license is illustrated in Fig. 14.

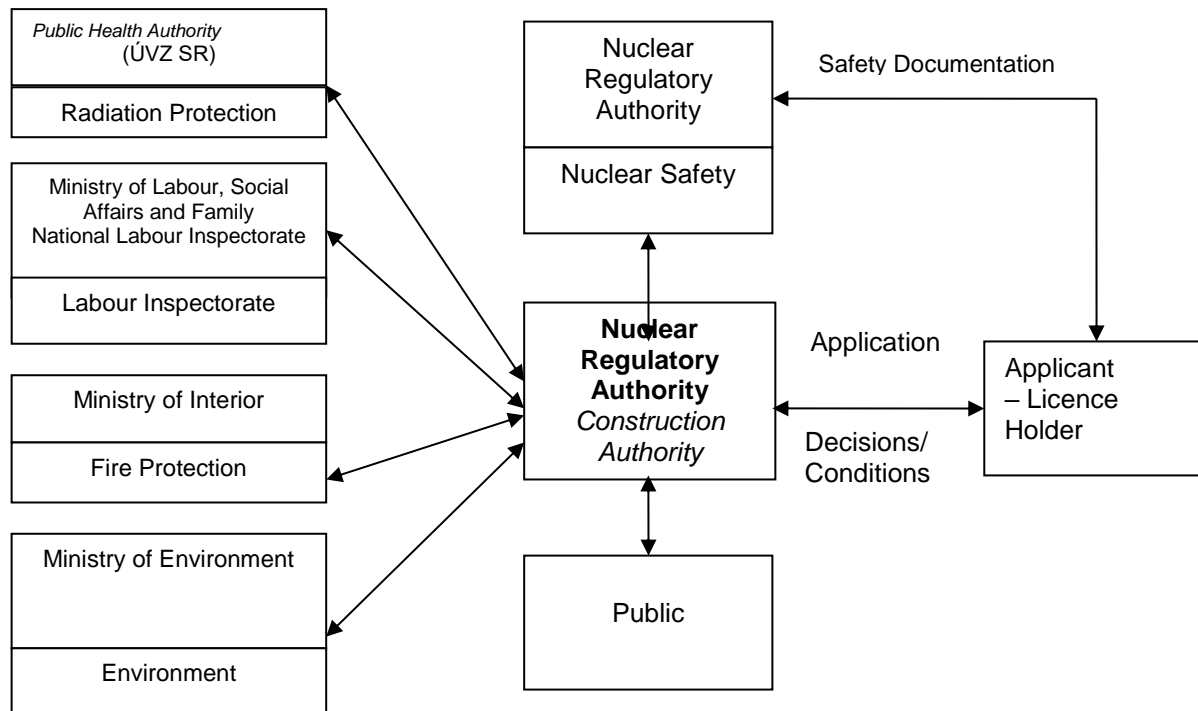


Fig. 14 Authorization procedure for siting

The basic conditions for authorization is the elaboration and submission of safety documentation listed in the annexes of the Atomic Act, necessary for issuance of particular types of decisions and for meeting the legislative requirements for nuclear safety. An essential criteria is also the fulfilment of conditions of preceding approval procedures and decisions of regulatory authority. See also page 52.

The following authorisations are issued by the ÚJD SR and require the submission of documentation in accordance with the requirements of the Atomic Act. In all cases, the relevant safety report, prepared to the required level and scope, must be submitted:

- *Building permit.*
- *The authorisation for commissioning of the nuclear installation is part of the authorisation for early use of the construction - after meeting the legislative requirements, the ÚJD SR will issue the authorisation in question. This provides for the dual function of the ÚJD SR as a nuclear safety supervisory authority under the Atomic Act, in parallel with its function as a building authority under the Building Act.*
- *The commissioning of a nuclear installation is divided into several stages, each of which must be approved separately by the ÚJD SR.*
- *Operating licence - issued on written application and after all statutory requirements have been met. The operating licence is not time-limited, but the licence holder is required by law to demonstrate the readiness of the installation for further operation by periodic nuclear safety reviews every ten years.*

- *Final acceptance - issued as a result of the final acceptance procedure.*

Details concerning the scope, content and method of preparation of documentation required for individual decisions are defined in the Decree of the ÚJD of the SR No. 58/2006, as amended by Decree No. 31/2012, Decree No. 102/2016 and 155/2022.

The documentation, which forms part of the application for the different ÚJD SR decisions, and which must be submitted, is listed in Annexes 1 and 2 of the Act No. 541/2004 Coll. (Atomic Act). Details on the scope, content and method of preparation of documentation of nuclear installations are set out in the ÚJD SR Decree No. 58/2006, establishing details on the scope, content and method of preparation of documentation of nuclear installations necessary for individual decisions (ÚJD SR Decree No. 58/2006).

All pending administrative procedures and the ÚJD SR decisions *issued* are immediately published on its website, as well as on the *electronic* official notice board of the ÚJD SR, which is available 24/7 *via a touch-screen information kiosk* at the offices of ÚJD SR. It is also possible to observe the procedural actions of the ÚJD SR in licensing procedures, in which the parties to the proceedings and the public concerned are given the opportunity to make comments, suggestions for additions or raise objections when issuing decisions at all stages of the nuclear installations licensing process. During the course of the proceedings, a party may participate in the decision-making process by consulting the file, submitting procedural motions and making observations, and, before a decision is rendered, any party to the proceedings has the right to comment on the basis of the decision and the manner in which it was obtained, as well as to propose that it be supplemented. After the decision has been issued, any party to the proceedings may lodge an appeal against the first instance decision of the administrative authority. Second-instance proceedings proceed, *mutatis mutandis*, according to the provisions of the first-instance proceedings, with all the rights and obligations of a party to the proceedings. If a party to the proceedings considers that his or her rights have been infringed in the administrative process, he or she may bring an action before the courts within the appropriate time limit to review the legality of the administrative decision.

E.2.1.3 Regulatory body – ÚJD SR

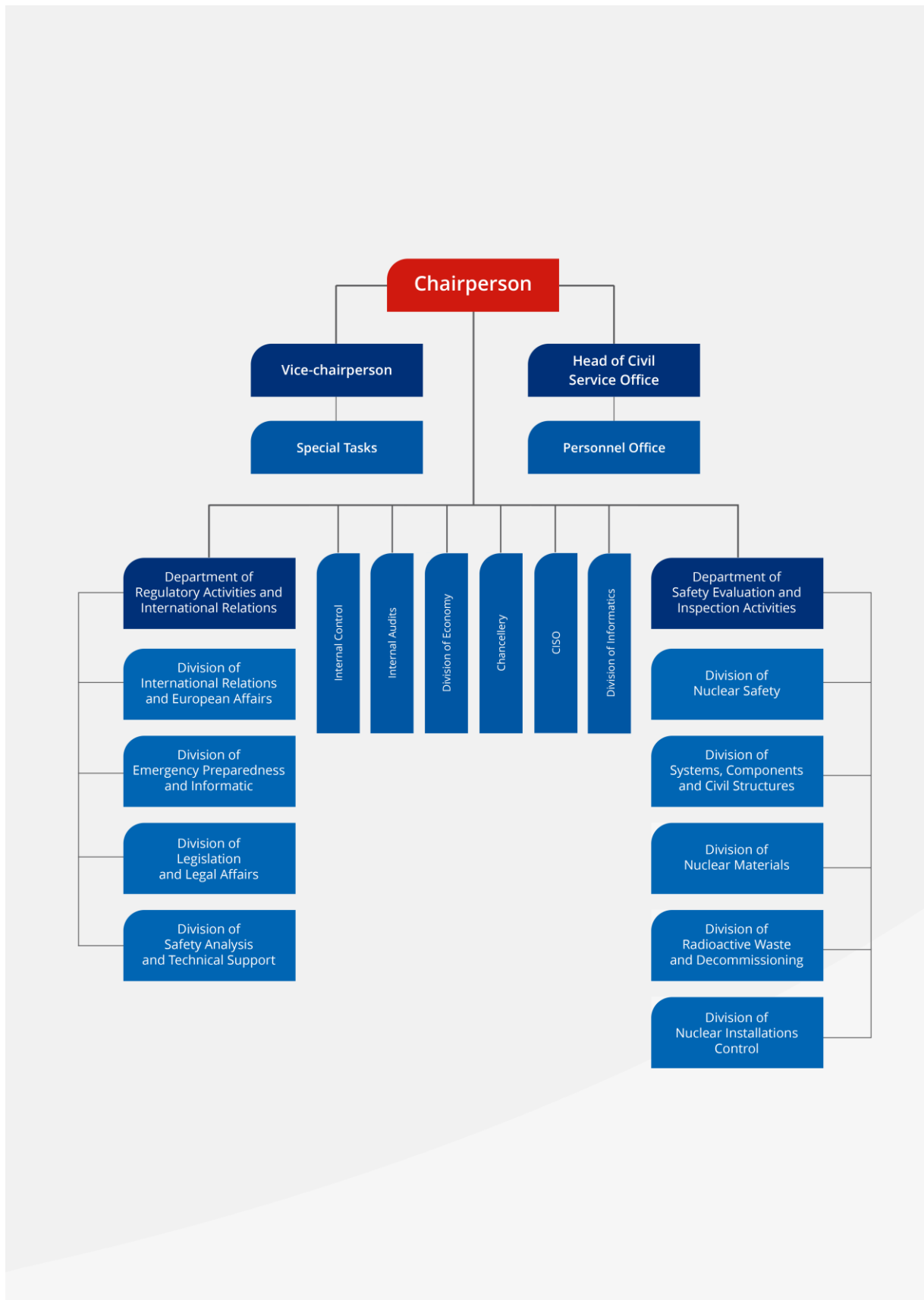


Fig. 15 Organisational structure of ÚJD SR

ÚJD SR has been continuously improving its management system. In 2002, the process oriented internal quality management system was introduced with the aim to achieve more effective and more efficient fulfilment of its tasks. In the following period, this management system was extended to all activities of ÚJD SR. *The basis for quality assurance of ÚJD SR s activities is the implemented quality management system pursuant to the Slovak Technical Standard STN EN ISO 9001:2016 Quality Management Systems, requirements and IAEA GS-R-3 documents. The requirements of the Slovak Technical Standard STN EN ISO 9004:2019 Quality Management. Quality of organization. Guidance for achieving sustainable success (ISO 9004:2018). Performance improvement guidance and other Slovak Technical Standards from the STN set of the management systems STN EN ISO apply.* The basic document of this system is the Quality Manual formulating the Quality Policy, setting the quality objectives, which the Authority intends to achieve in relation to the population of the SR, as well as to the international community. The set quality objectives, as well as functioning of the whole system, are subject of internal audits, as well as regular annual assessments. For all processes the Authority has relevant guidelines developed, as well as system of other governing acts, management, support, inspection procedures, and others. The CAF system (Common Assessment Framework) is also used to assess and improve the activities of the Authority. Activities relating to the management system are managed by the Board for the management system headed by the chairperson of the Authority. The Board develops concept for further development of the management system. In doing this it takes into account experiences from implementing management systems in the state administration and international recommendations in the field of management of regulatory bodies for nuclear safety.

E.2.1.4 Role of the Regulatory body

Pursuant to the Atomic Act ÚJD SR discharges state regulation of nuclear safety of nuclear installations, in which in particular:

1. Performs inspections of workplaces, operations and premises of nuclear facilities, operations and premises of holders of consents or licenses and in doing that it controls compliance with the obligations resulting from this Act, from generally binding legal regulations issued on the basis of this Act, operational regulation issued by the licensee, compliance with the limits and conditions for safe operation and safe decommissioning, quality management system, as well as obligations resulting from decisions, measures or regulations issued on the basis of the Atomic Act;
2. Controls fulfilment of commitments under international treaties, by which the Slovak Republic is bound in the field of competencies of ÚJD SR;
3. Controls the system of staff training, training programs for professionally qualified staff, training programs for selected staff of licensees and controls professional competence of staff, as well as special professional competence of staff of licensees;
4. Identifies in-situ the status, the causes and consequences of selected failures, incidents or accidents at a nuclear installation or an event during transport of radioactive materials; during investigation of an incident, accident or event during transport of radioactive materials performed by other bodies it participates as a obliged party in such investigation;

5. Checks performance of mandatory inspections, reviews, operating controls and tests of classified equipment with respect to nuclear safety;
6. Orders elimination of deficiencies having impact on nuclear safety, physical protection, emergency preparedness;
7. Reviews nuclear safety, physical protection and emergency preparedness independently from the licensee;
8. Checks the content, updates and exercising of emergency plans, which it approves or reviews, and organizes trainings on these;
9. Conducts in-situ reviews at workplaces, in operations and premises of applicants for issuing authorization or license and holders of authorization or license, including control of compliance with the Quality Management System.

Regulatory Methods to Verify Operator's Compliance with Authorization Conditions

Inspections

The tasks in the field of state regulation are exercised by ÚJD's nuclear safety inspectors. Inspectors follow the regulation "Inspection activity of the ÚJD SR" when carrying out tasks in the field of state supervision. The Regulation establishes a uniform procedure for inspections, preparation and evaluation of the annual inspection plan, management of the ÚJD SR inspection programme, preparation of documentation of inspection activities and analysis of the ÚJD SR inspection activities.

Inspection plan is a tool for continuous and systematic evaluation of inspection activities at nuclear installations and during transports and controls of nuclear materials. As a rule, such plans are developed for the period of one year and they cover in a complex way all areas of regulation of nuclear safety. Inspections follow inspection procedures that are part of the ÚJD's Inspection Manual. For inspection activities with no developed inspection procedures, individual inspection procedures are prepared.

Types of inspections

In general, there are planned and unplanned inspections – as the first level of division. In the second level, planned and unplanned inspections are divided into routine, special and team inspections.

Planned inspections:

Routine inspections - the nuclear safety inspector verifies the assurance of compliance with requirements and conditions of nuclear safety, conditions of the installation, compliance with approved limits and conditions and with selected operational provisions. Routine inspections are performed mainly by site inspectors. In case of inspection, focus of which exceeds the professional competencies of the site inspector, inspection is performed by nuclear safety inspectors from the Department of Safety Reviews and Inspection Activities and Department of Regulatory Activities and International Relations of ÚJD SR. Routine inspections follow the procedures contained in the Inspection Manual.

Special inspections are performed by nuclear safety inspector in accordance with the basic inspection plan. Special inspections focus on specific areas, in particular on the verification of compliance with the

requirements and conditions of regulation pursuant to section 31 of the Atomic Act (Act 541/2004 Coll.). Special inspections are generally carried out according to the procedures set out in the Inspection Manual.

Team inspections focus on the verification of compliance with requirements and conditions of regulation pursuant to section 31 of the Atomic Act (Act 541/2004 Coll.), normally within several areas in parallel. Team inspections are planned for areas selected on the basis of long-term assessment of operator's results of analyses of inspections. Team inspection is defined as an inspection, in which several departments participate.

Unplanned inspections:

Unplanned inspections are performed by nuclear safety inspectors in a form of routine, special or team inspections. These inspections respond to the conditions at the NI (for example, commissioning stages) or incidents at NI. ÚJD SR thus responds to the situation at NI.

Rules valid for all types of inspections:

- inspections are, in principle, announced in advance to the supervised entity. However, they may also be unannounced if their focus and nature so require,
- the relevant site inspector is notified in advance of the inspection at the NI. The site inspector shall normally attend the inspection,
- each inspection that is carried out by more than one inspector has a designated inspection team leader.

Inspection Report (Protocol)

Each inspection must be documented in the form of a report or record. Binding corrective measures shall form part of this record. They must be clearly formulated to impose the rectification of the deficiencies found and be comprehensible with clearly stated deadlines.

Analysis of inspection activity

The analysis of inspection activity includes a statistical evaluation of findings. The purpose of the statistical evaluation is to determine the distribution and frequency of findings from inspection activity. Based on the evaluation of the trends in inspection findings, it is possible to modify the inspection plan for the following period, in particular in those areas where the most deficiencies have been detected in the supervised entity.

Sanction

In accordance with the authorisation to operate and to manage RAW, the nuclear safety requirements and conditions approved and implemented by the regulatory authority are monitored. In the event of a breach of nuclear safety, the supervisory authority may impose fines on the licensee, as well as on its employees. In the event of non-compliance with the requirements or breaches of the provisions of the Act, the regulatory authority is entitled to impose punitive measures on the licensee, including financial penalties.

Checking compliance with the regulatory requirements through inspections

There were 165 inspections scheduled for 2023, of which 14 were cancelled for objective reasons. There were 34 unplanned inspections in 2023. A total of 185 inspections were conducted, with 57 inspections still in progress as at 25 January 2024, and 128 inspections completed. Of the completed inspections, 5 were closed in a form of report (with findings) and the rest of them by record. (Table 3)

Nuclear installation	Planned			Unplanned	Total	Of that Report	Not completed
	Routine	Special	Team				
JAVYS	8	20	3	2	33	0	7
SE – EBO (V2)	4	16	9	1	30	1	7
SE – EMO 1,2	4	20	11	0	35	3	11
SE – MO3,4	1	10	1	3	15	4	6
VUJE	0	3	0	0	3	0	1
NM and RAW shipments	0	9	0	9	18	0	0
Control and registration of NM	0	29	0	17	46	1	0
Other inspections	0	3	0	2	5	0	2
Total	17	110	24	34	185	9	34

Table 3: Preliminary statistics of inspections at NI in SR in 2023

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 drone operation;
- Training and qualification of staff;
- Physical protection;
- Coordination of site emergency response for emergency drills;
- Operation and fire safety;
- Safety systems monitoring test;
- *Checking the storage of fresh and spent nuclear fuel;*
- Checking for changes in documentation;
- Emergency planning – monitoring systems performance inspection;
- Technical specifications/Limits and Conditions for operation: record;
- Inspection after refuelling;
- Maintenance, testing, calibration and I&C revisions of classified equipment;
- Fulfilment of the Action Plan for LTO;
- On-line transfer technological, radiation and meteorological data;
- Enhancing resilience to earthquakes;
- PSA study;
- Containment leak test, regular refresher;
- Inspection of the processes for developing, evaluating, approving, validating, updating and assessing Emergency Operating Procedures);
- QA system control;

- Coordination of emergency response throughout the emergency exercise area;
- Readiness to commissioning;
- Safety culture;
- Integrated Management System;
- Cyber Security;
- RAW shipments;
- Fresh fuel transports;
- Nuclear materials.

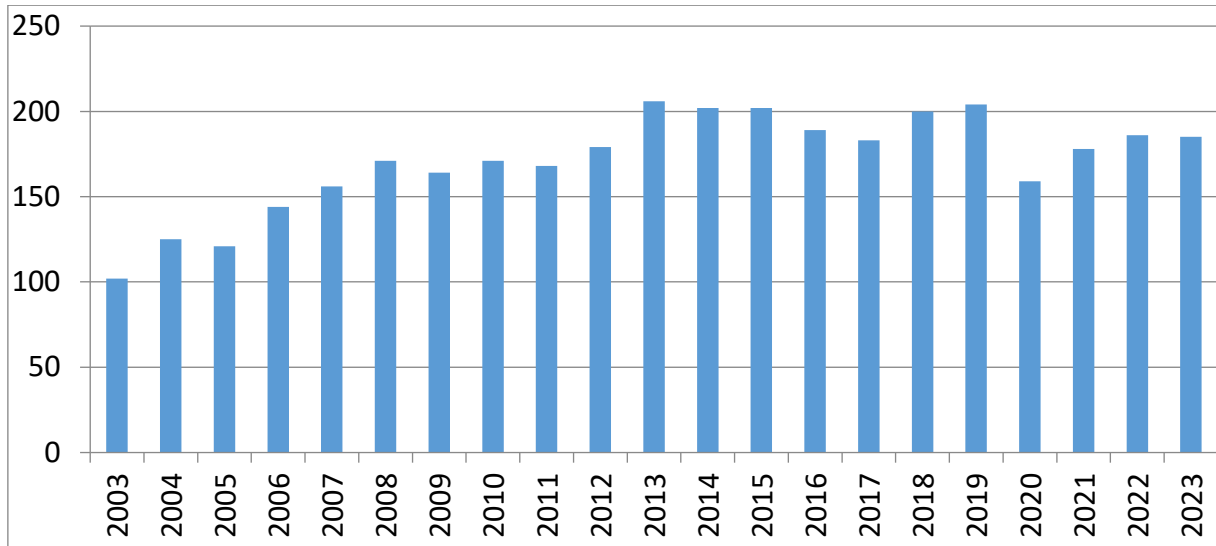


Fig. 16 Number of ÚJD SR inspections in the period 2003 – 2023

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Number of findings	71	56	57	44	68	26	26	34	32	47	27	21	46	46

Table 4 Number of findings during inspections per year

Type of finding	Description/significance	Number	(in %)
Fire protection (FP)	Other deficiencies	1	4.35
Operation (OP)	Staff error and mistakes and non-adherence to documentation	4	17.38
	Deficiencies in documentation		
Emergency preparedness (EP)	Deficiencies in the technical cond. of emergency response equipment	1	4.35
	Deficiencies in documentation		
Equipment testing (ET)	Staff error and mistakes and non-adherence to documentation	6	26.09
	Deficiencies in documentation		
Maintenance (MA)	Staff error and mistakes and non-adherence to documentation	1	4.35
	Deficiencies in documentation		
Quality Assurance (QA)	Staff error and mistakes and non-adherence to documentation	7	30.43
	Other deficiencies		
Training and qualification (TQ)	Deficiencies in documentation	1	4.35
Control and registration of NM	Deficiencies in documentation	2	8.7

Table 5 Types of findings in 2023**Safety significance of inspection findings:**

- Category 1: the findings may have or have a minor impact on nuclear safety or have an indirect impact on nuclear safety. Findings do not compromise defence-in-depth barriers.
- Category 2: Findings may have or have a moderate impact on nuclear safety or are recurring Category 3. Findings do not compromise the defence-in-depth barrier but the barrier has been compromised.
- Category 4: findings with a major impact on nuclear safety or recurring category 2 findings. The occurrence of these findings has led to the breaching of one of the defence-in-depth barriers. The licensee's level of vigilance is low.

E.2.1.5 International Cooperation**Cooperation with the International Atomic Energy Agency (IAEA)**

The cooperation between the Slovak Republic and the IAEA in the field of technical projects has been extremely successful. As part of it, there have been expert missions to assess nuclear safety, the introduction of good laboratory practice in tissue sterilisation in healthcare, the assessment of material degradation of primary circuit components, etc.

A significant part of the regional projects dealt with nuclear safety issues. Within the framework of the regional projects, internships of foreign experts, seminars, workshops and training courses with broad international participation are held in the Slovak Republic.

In September 2022, the Slovak Republic invited a full-scale IAEA IRRS Mission, to assess the Slovak regulatory framework for nuclear safety and radiation protection against IAEA safety standards. The Mission reviewed the following areas and cross-cutting topics: government responsibilities and functions, global nuclear safety regime, responsibilities and functions of regulatory bodies, management system of regulatory bodies, authorisation, safety review and assessment, inspections, law enforcement, development of laws, decrees and guides, emergency preparedness and response, radiation protection of workers, the public and the environment, radiation protection in the conduct of medical exposure, transportation of radioactive materials, radioactive waste management and decommissioning of nuclear facilities.

The Mission confirmed that the regulatory framework in the SR is mature, but regulatory oversight of nuclear safety and radiation protection is disproportionate and inconsistent across regulatory bodies. Mission conclusions categorised as suggestions for improvements and recommendations, were elaborated by the ÚJD SR together with other state supervisory authorities into an Action Plan to address the measures from the IRRS Mission, which was approved by the Government in 2024.

The self-assessment, the IRRS Follow-up Mission and the Action Plan ensures the streamlining of the ÚJD SR activities and the overall regulatory framework for nuclear safety and radiation protection in the SR, increases the efficiency of activities, service delivery and the satisfaction of the legitimate needs

and requirements of stakeholders. The relevant provisions of Act No. 541/2004 Coll. (Atomic Act) have been met, as well as the requirements of the Council Directive 2014/87/Euratom of 8 July 2014, amending Directive 2009/71/Euratom, establishing the Community framework for nuclear safety of nuclear installations, IAEA and internal normative acts of the ÚJD SR. At the same time, this contributes to the implementation of the National Quality Programme of SR.

A Follow-up Mission to check the implementation of the Action Plan is foreseen in 2026.

In February 2023, following the IRRS Mission, an ARTEMIS Mission was conducted, an IAEA service for the international assessment of the national policy and national programme for the management of SNF and RAW, decommissioning of nuclear installations and remediation.

*The ARTEMIS Mission **assessed the compliance of the Slovak condition with the IAEA safety standards.** The results of the Mission are summarised in the Final Report. The ARTEMIS Mission appreciated the high standard of the infrastructure for the management of RAW from the decommissioning of nuclear installations, while formulating a number of recommendations and suggestions for further improvements, in particular in the area of the preparation of a deep geological repository for high-level radioactive waste. The findings of the ARTEMIS Mission have been translated into an Action Plan, taken note of by the Slovak Government in August 2023, and are also taken into account in the framework of updated National Programme for the Management of SNF and RAW.*

Cooperation with the Organization for Economic Cooperation and Development/ the Nuclear Energy Agency (OECD/NEA)

Based on the Government Resolution 245/2001, the ÚJD SR, coordinates the cooperation with OECD/NEA and provides for the fulfilment of the obligations of the SR arising from this membership. The activities of the OECD/NEA are managed by the Nuclear Energy Steering Committee, which has been chaired by the Chairperson of the ÚJD SR since 2016. Representatives of the ÚJD SR regularly participate in meetings of the Nuclear Energy Steering Committee, in meetings of the OECD/NEA Standing Technical Committees and working and expert groups, as well as in OECD/NEA projects.

Cooperation with the European Commission and the EU Member States

Representatives of the ÚJD SR attend meetings of expert groups of the EU Council and the European Commission on a regular basis with the aim to exchange knowledge on reviews of the level of nuclear safety of nuclear installations in Europe, and they participate in developing the EU legislation in selected areas.

Bilateral Cooperation

Formal (based on international treaties) and informal cooperation exists with all neighbouring countries (Czech Republic, Poland, Ukraine, Hungary and Austria), as well as with other countries (such as Armenia, Bulgaria, Germany, France, Finland, Slovenia, the US). The cooperation focuses on exchange of experience in the field of peaceful use of nuclear energy, developing the system of emergency preparedness, accident analyse, etc.

Forum of State Nuclear Safety Regulators of countries operating NPPs of VVER type

Forum of state nuclear safety authorities of countries operating NPPs with WWER type of reactors was established with the aim of mutual exchange of experiences in construction and operation of nuclear power plants of WWER type. These activities are also supported by the IAEA and other developed countries having a nuclear program. Ad hoc working groups have been set up to deal with the current issues of nuclear safety and state regulation.

Network of Nuclear Regulatory Bodies of countries with small nuclear program

Network of Regulators of Countries with Small Nuclear Program (NERS) was established in 1998, initiated by the Swiss Regulator (HSK) with the aim to enhance cooperation and exchange of experiences among countries with similar nuclear program. The ÚJD SR has been taking an active part in the activities of NERS on a regular basis.

E.2.1.6 Financial and Human Resources of the Regulatory Body – ÚJD SR

The budget Chapter of ÚJD SR is linked to the state budget with its revenues and expenditures. Since 1 January 2008, annual contributions for execution of state regulation in nuclear safety have been introduced into the legal order of SR. The Act No.94/2007 Coll. amending the Atomic Act imposes an obligation to the licensees to pay annual contributions for execution of state regulation in nuclear safety. The basic principle of the adopted law is to secure 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.

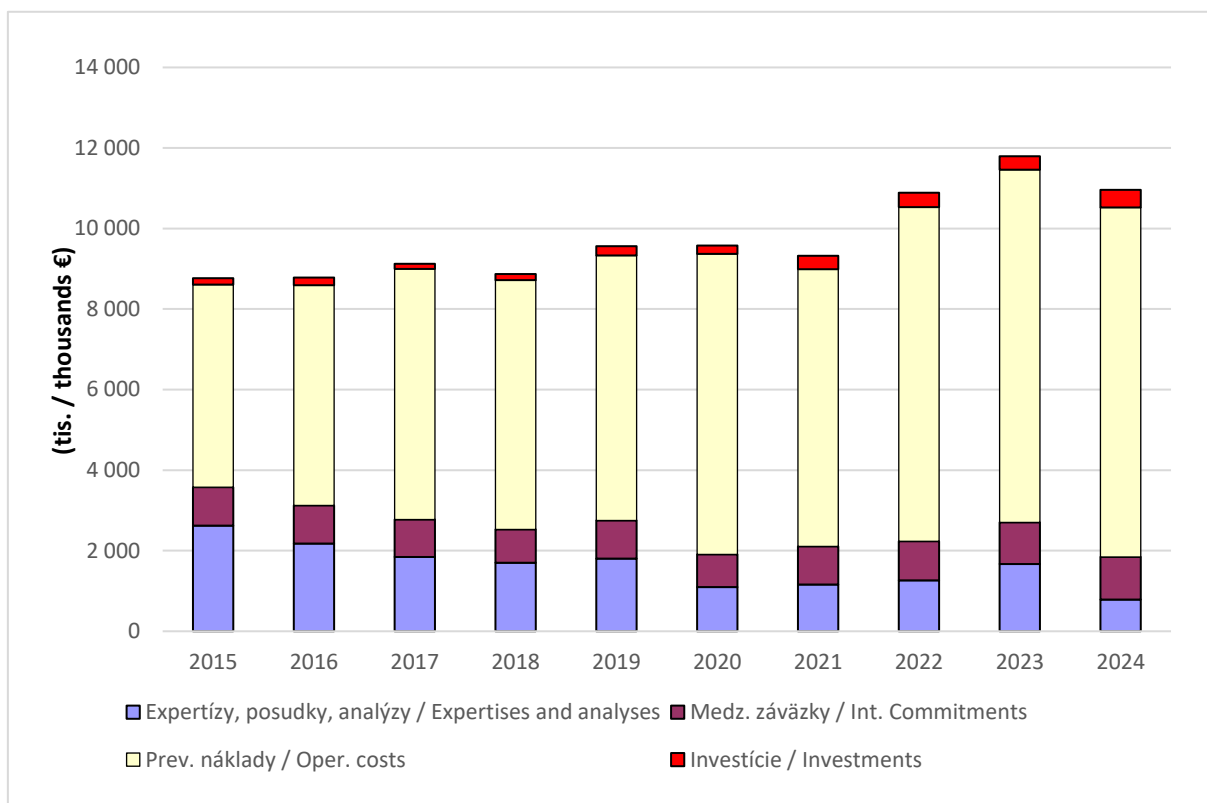


Fig. 17 Structure of the budget chapter

For the year 2024, the ÚJD SR budget schedule contains a total number of 134 employees, of which 121 civil servants and 13 employees in public work.

Every year, ÚJD SR approves and evaluates the annual plan of continuous learning of all its employees. Continuous learning is considered by ÚJD SR to be a systematic process of providing and acquiring knowledge, maintaining, improving and supplementing the skills, abilities, habits and experience that the employee needs to perform work activities. This process distinguishes between adaptation training and competence training. Adaptation training is intended to ensure that a new employee is quickly integrated into the current job position. Competence training includes expert training, language training, management training, training focused on personal development, as well as training in the field of information technology. Special attention is paid to the competence training of ÚJD SR inspectors, in the form of modules focused on professional areas related to the operation of nuclear installations.

The ÚJD SR is currently running a project “Implementation of knowledge management“, which is to ensure not only the transfer of knowledge between more experienced and less experienced staff, but also the preservation of critical knowledge.

The ÚJD SR uses also other forms of education and training, such as self-study or e-learning.

The ÚJD SR approves and evaluates the annual training program for its employees.

E.2.2 Radiation Protection Supervision

E.2.2.1 State administration in the field of radiation protection

Pursuant to Section 4 of Act No. 87/2018 Coll. on Radiation Protection, the state administration in the field of radiation protection is discharged by the radiation protection authorities, namely:

- Ministry of Health of SR - MZ SR,
- Public Health Authority of SR - ÚVZ SR,
- Regional public health authorities; and
- Other bodies of radiation protection having competence at the relevant ministry (MDV SR, Ministry of Defence of the SR, MV SR and the Slovak Information Service).

The competent supervisory and regulatory authority in the field of radiation protection for the management of radioactive waste produced in industrial facilities, science and research institutions, in agriculture, etc., disused radioactive sources and radioactive materials of unknown origin, is the Regional Public Health Authority Bratislava, in the territorial district of the Bratislava Region, the Regional Public Health Authority based in Nitra, in the territorial district of the Nitra Region, Trnava Region and Trenčín Region, Regional Public Health Authority based in Banská Bystrica, in the territorial district of the Banská Bystrica Region and Žilina Region, and Regional Public Health Authority based in Košice in the territorial district of the Košice Region and Prešov Region. The structure of supervisory and regulatory bodies in the health care sector is shown in Fig. 18.

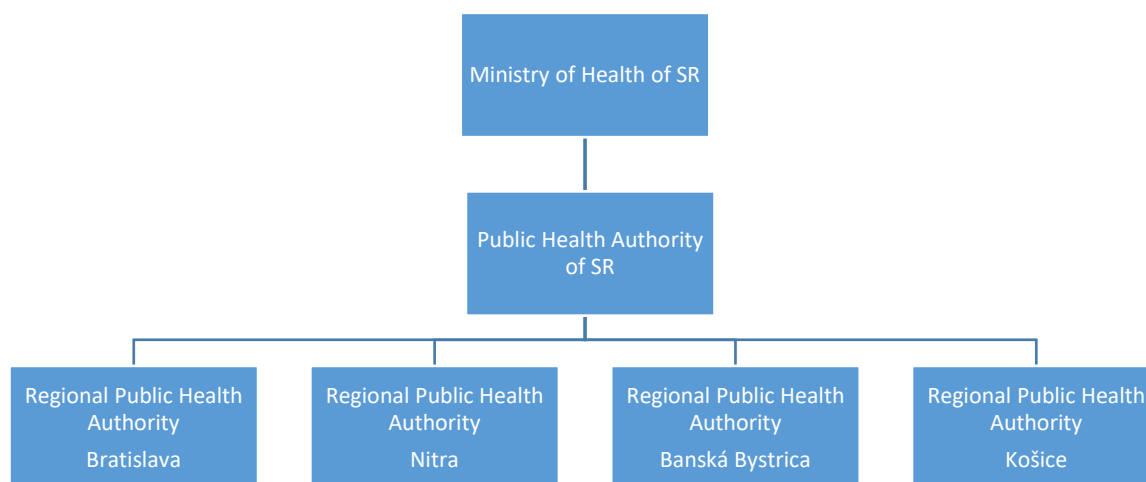


Fig. 18 Structure of state supervision in radiation protection

Supervision of radiation protection in the SR is provided by the state supervision according to Section 155 of Act No. 87/2018 Coll. on radiation protection. The state supervision authority in nuclear installations is the ÚVZ SR. *The organizational structure of ÚVZ SR is shown in Fig. 19.*

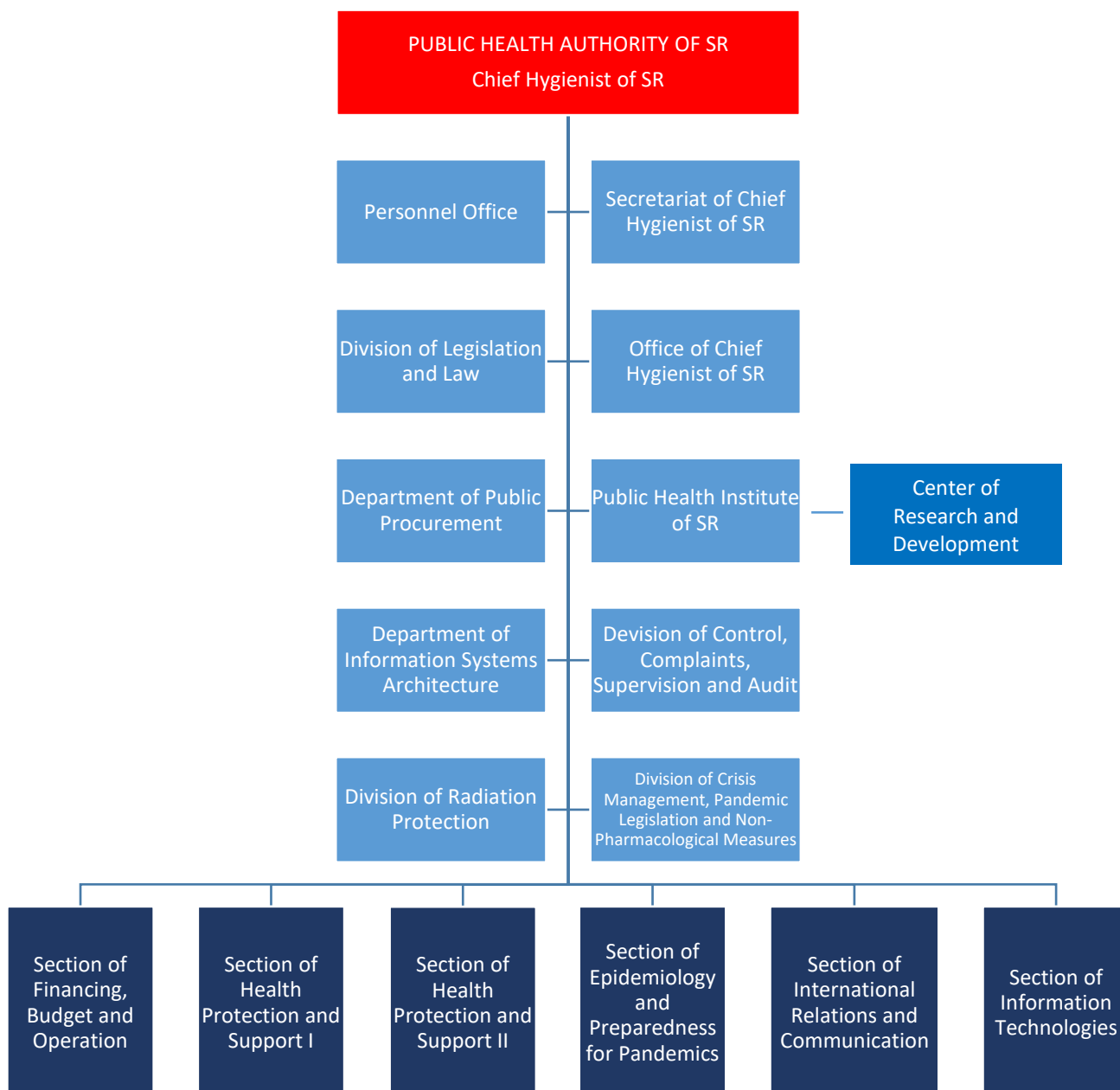


Fig. 19 Organizational structure of ÚVZ SR

The radiation protection department in terms of fulfilment of tasks and discharging state supervision in the field of radiation protection, the scope and specification of the activities performed (Fig. 20), is divided into:

- a) Unit of radiation protection at workplaces with sources of ionising radiation;
- b) Unit of radiation protection in nuclear-fuel cycle and in RAW management;
- c) Unit of Ionising Radiation Health Risk Assessment and Exposure Guidance for workers, residents and patients;
- d) Unit of Natural Sources of Ionising Radiation;
- e) Unit of Monitoring, Laboratory Analyses and Emergency Preparedness;

f) *Unit of Central Registers, Records and Information Systems in Radiation Protection.*

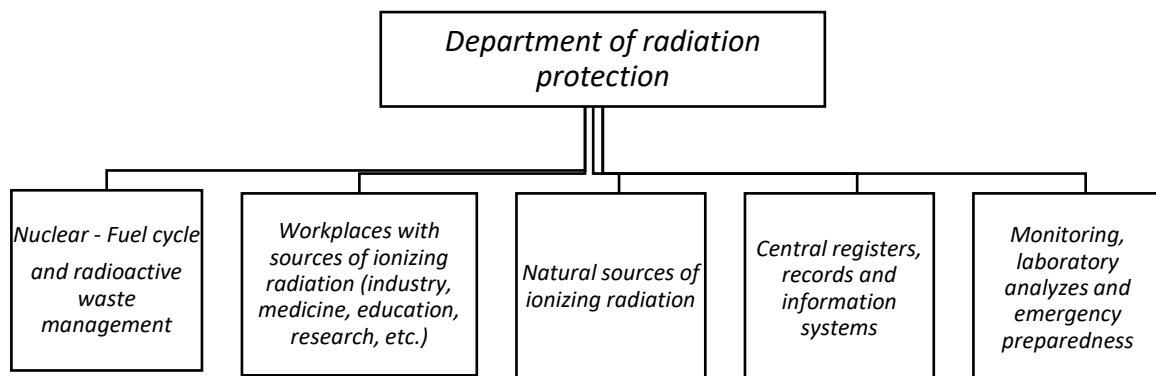


Fig. 20 Structure of Radiation Protection Department

The ÚVZ SR issues various types of decisions, binding opinions, instructions to remedy identified deficiencies, and also directives, recommendations, manuals and guidelines in the field of radiation protection.

The competence of the ÚVZ SR in radiation protection is enshrined in Section 6 of Act No. 87/2018 Coll. on radiation protection (<https://www.slov-lex.sk/pravne-predpisy/SK/ZZ/2018/87/20180401>).

Every year, the ÚVZ SR issues reports on its activities available at: [Výročné správy - ÚVZ SR - Liferay \(uvzsr.sk\)](http://uvzsr.sk).

In the field of radiation protection, ÚVZ SR carries out state supervision over radiation protection in nuclear installations and workplaces where activities for which it has issued a permit are carried out, determines the conditions for the performance of activities leading to radiation exposure, services important in terms of radiation protection and for the release of radioactive materials and radioactively contaminated objects and materials from administrative control, in nuclear installations and workplaces, for the operation of which it has issued authorisation, it determines the conditions and authorised limits.

The UVZ SR determines the reference levels for optimising radiation protection in an emergency exposure situation or in a persistent exposure in an existing exposure situation, the conditions for the transition from an emergency exposure situation to an existing exposure situation and proposes a strategy for the management of an existing exposure situation. Monitors and directs the radiation exposure of workers by checking compliance with exposure limits and checking the justification of activities leading to exposure, checks compliance with the limit dose of a representative person for the design, construction and operation of a nuclear installation for radioactive discharges into the atmosphere and hydrosphere. *It monitors the radiation situation, collects and processes data on the results of monitoring in the Slovak Republic for the assessment of radiation exposure and the assessment of the impact of radiation on the health of the public. It determines technical requirements,*

organisational requirements and procedures used in the optimisation of radiation protection and assesses optimisation studies.

In the field of radiation protection, ÚVZ SR provides, among other things also:

- 1) monitoring compliance with exposure limits for workers and the public;
- 2) assessing over-exposure of workers with sources of ionising radiation;
- 3) assessing the effects of ionising radiation on the health of workers and the public;
- 4) monitoring, assessment and guidance on exposure of patients during examinations and treatment using ionising radiation in the provision of health care and biomedical research;
- 5) issuing expert guidance, instructions and recommendations for radiation protection;
- 6) issuing measures to ensure radiation protection and to limit the exposure of employees and the public;
- 7) control of provision of safety and security of source of ionising radiation;
- 8) issuing instruction for the elimination of identified deficiencies in the exercise of state supervision in the field of radiation protection;
- 9) determining requirements for the management of radioactive materials, radioactive waste, institutional radioactive waste and radioactive materials of unknown origin;
- 10) maintaining a central register of doses of workers in the Slovak Republic;
- 11) maintaining a central register of sources of ionising radiation in the Slovak Republic;
- 12) maintaining records of notified, registered and authorised activities leading to exposure and services relevant to radiation protection;
- 13) keeping records of operators and workplaces with sources of ionising radiation;
- 14) carrying out specialised dosimetric, spectrometric, radiometric and radiochemical analyses and measurements of environmental, occupational and food-chain samples to assess the dose burden to workers and the public;
- 15) monitoring of the radiation situation in the Slovak Republic, collection and processing data on the results of monitoring in the Slovak Republic for the assessment of the impact of radiation on the health of the population;
- 16) ensuring radiation protection for seizure of radioactive materials of unknown origin to prevent their misuse for illegal manipulation, including the possibility of their misuse for terrorist purposes;
- 17) ensuring emergency preparedness and response, and other.

ÚVZ SR is further involved in:

- 1) Verification of professional competence of persons to perform activities leading to exposure;
- 2) The activities of the radiation monitoring network of the Slovak Republic and monitoring of radiation situation in the environment and assessment of the content of radioactive materials in the environmental compartments and in the food chain and informing the institutions of the European Union on the radiation situation in the Slovak Republic;
- 3) Control of the radiation situation in the vicinity of operating nuclear installations and monitoring of their impact on the environment and the public;
- 4) Dealing with emergencies and implementing measures in the event of loss of control over sources of ionising radiation and the discovery of radioactive material of unknown origin, and other activities.

E.2.2.2 Authorisation Procedure

When authorising an activity leading to exposure or authorising a service important in terms of radiation protection, the ÚVZ SR proceeds pursuant to the Act No. 71/1967 Coll. (Administrative Procedure Code). Pursuant to Section 28 (1) of Act No. 87/2018 Coll. on radiation protection, the authorisation of the ÚVZ SR in terms of radiation protection is required for:

- a) the operation of a nuclear installation and the decommissioning phases of a nuclear installation;

- b) receipt, storage and handling of fresh nuclear fuel;
- c) the management of spent nuclear fuel and the management of radioactive waste, including the collection, sorting, storage, treatment, conditioning for disposal and disposal of radioactive waste;
- d) the transport of radioactive material or fissile material, radioactive source, radioactive waste, spent nuclear fuel and radioactive contaminated objects, which because of their activity, cannot be released from administrative control on the premises of a nuclear installation;
- e) the release from administrative control of radioactive materials and radioactively contaminated objects, which have been produced or used in a licensed activity leading to exposure in a nuclear installation.

ÚVZ SR pursuant to Section 32 (3) of Act No. 87/2018 Coll. on radiation protection, issues a binding opinion:

a) for nuclear installations in terms of radiation protection on the proposal for:

1. siting of NI and construction of a nuclear installation;
2. trial operation of a nuclear installation;
3. stage of commissioning of a nuclear installation;
4. construction and technological changes significant from the view of radiation protection during
 - 4a. construction of a nuclear installation;
 - 4b. trial operation of a nuclear installation;
 - 4c. stage of commissioning of a nuclear installation;
 - 4d. operation of a nuclear installation;
- 4e. stages of decommissioning of a nuclear installation;
5. decommissioning of a nuclear installation;
6. a new technological procedure for decommissioning of a nuclear installation;
7. an exceptional exposure in an activity leading to exposure in a nuclear installation;
8. on-site emergency plan of a nuclear installation,28)
9. organisational changes and preparedness in the radiation protection unit, units carrying out control and assessment of the radiation situation and radiation protection guidance in a nuclear installation, within the scope of licensee`s obligations under this Act;
10. dose limits for workers set by the operator or employer of the outsourced workers;

b) for an optimisation study on the release of radioactive materials from a nuclear installation from under administrative control, etc.

The basic precondition for the issuance of an authorisation or a binding opinion is the submission of the required documentation and compliance with the requirements laid down by Act No. 87/2018 Coll. on radiation protection.

The permit of ÚVZ SR for activities leading to exposure in relation to nuclear facilities is not the final granting of a licence, but it is a condition for the issuance of a licence.

E.2.2.3 Regulatory methods to verify compliance by the licensee

State supervision in the field of radiation protection in nuclear installations is discharged by the staff of ÚVZ SR.

ÚVZ SR checks compliance with the Act No. 87/2018 Coll. on radiation protection and other generally binding legal regulations issued for its implementation, compliance with the scope and the conditions

specified in decisions and authorisations, as well as the implementation of actions imposed to eliminate the identified deficiencies by the state supervision through inspections.

Inspection activities are performed by the competent radiation protection bodies through a designated civil servant who shall be a radiation protection (RP) inspector.

The RP inspector shall present his/her official identity card when performing inspection activity.

The RP inspector may carry out inspection activity in facilities requiring physical security and facility security only after approval has been granted by the statutory authority of the facility manager, and if he/she is certified by the National Security Authority to inspect classified information of a classification level of at least "Confidential".

In carrying out his/her tasks, the RP inspector is authorised to:

- a) require proof of the identity of the persons carrying out activities which are the subject of the inspection activity;*
- b) enter land, premises, facilities and buildings related to the subject of inspection activity and to require the necessary accompaniment;*
- c) take samples in the quantities and to the extent necessary for the analysis and carry out their expert assessment;*
- d) arrive at findings, including the necessary photos, videos and audio recordings;*
- e) request information, data, explanations, supporting documentation;*
- f) consult the relevant documents;*
- g) impose measures on-site for the elimination of identified deficiencies, to draw-up a report on imposed measures;*
- h) order in state of emergency, which is not an emergency under a special regulation, the implementation of appropriate protective measures,*
- i) check fulfilment of:*
 - 1. imposed measures to eliminate identified deficiencies,*
 - 2. ordered protective measures in an emergency.*

ÚVZ SR performs state supervision based on a pre-prepared inspection plan, which is updated once a year. In preparing and updating it, a graded approach shall be applied, taking into account the extent and nature of the risk associated with the performance of activities that are subject of supervision. Inspections can also be performed as unscheduled.

The control system of compliance with the obligations and requirements for radiation protection assurance laid down by acts and compliance with conditions and obligations laid down in the authorization for the activity leading to exposure is especially provided by a system of targeted in situ inspections. Very effective tool and information source is also the complex system of reports, information and announcements on nuclear installation situation, on employees exposure, on extraordinary events and on RAW management, which the operator shall provide continuously *in writing in a paper or electronic form* to the regulatory authority within the time limits laid down in the authorization.

During on-site inspection, the following is checked in particular:

- Current state of radiation protection,
- Equipment condition,
- Regime observance,
- Monitoring system state, monitoring plan observance and keeping of records on results,

- Operational documentation,
- Documentation on the provision of radiation protection,
- Operational procedures,
- Records on deviations, results of incident investigations.

On-site inspections are connected with control measurements of the radiation situation and the taking of control samples by the supervisory staff.

Inspections are mostly focused on a special area important in terms of radiation protection:

- Control of ensuring *radiation protection* during power operation of reactors,
- Control of ensuring *radiation protection* during general outage,
- Control of monitoring discharges, data recording and assessment of their impact on the population dose load,
- Control of the implementation system and application of the ALARA principle,
- Control of ensuring health and professional competence of staff,
- Control of radioactive waste management,
- Control of system for releasing contaminated materials from administrative control, including the control of landfills of this material,
- Control of the fulfilment of the monitoring plan in the vicinity of the *nuclear installation* and assessment of the impact of the *NI's* operation on the radioactivity of components of the environment,
- Control of radiation situation in the premises of the *nuclear installation*,
- Control of preparedness for emergency situations and their material supply, control of shelters, gathering areas and checking that the protection of the staff in the areas of forced stay during accidents is ensured,
- Control of ensuring fulfilment of the trauma plan, etc.

Other *inspections* are performed as needed:

- Transport of radioactive materials,
- Transport of spent nuclear fuel,
- Events, incidents and accidents,
- Participation in emergency exercise.

Each inspection performed must be documented in the form of minutes. Binding measures to remedy the deficiencies identified shall be part of the minutes. They must be clearly worded in such a way as to require the removal of deficiencies found, and be comprehensible with clearly defined deadlines.

Financial and Human Resources of the Regulatory Body – ÚVZ SR

ÚVZ SR is a budgetary organization of the State, which through financial relations is connected to the budget of MZ SR. In the exercise of its powers, ÚVZ SR, as a body of radiation protection, *supervising activities leading to exposure in nuclear installations, activities in connection with the spent fuel management, RAW management and release from administrative control of radioactive materials and radioactively contaminated objects produced or used in activity leading to exposure, performed*

based on an authorisation in a nuclear installation, uses the human resources and financial resources necessary to fulfil its obligations under Act No. 87/2018 Coll. on Radiation Protection, in accordance with the resources available from the state budget; Radiation protection authorities may use external scientific knowledge and technical resources and expertise to support their regulatory functions. The trend in the headcount of the radiation protection body in the Ministry of Health (ÚVZ SR and regional public health authorities) is shown in Fig. 21. The state supervision in the field of radiation protection is performed under Act No. 55/2017 Coll. on civil service.

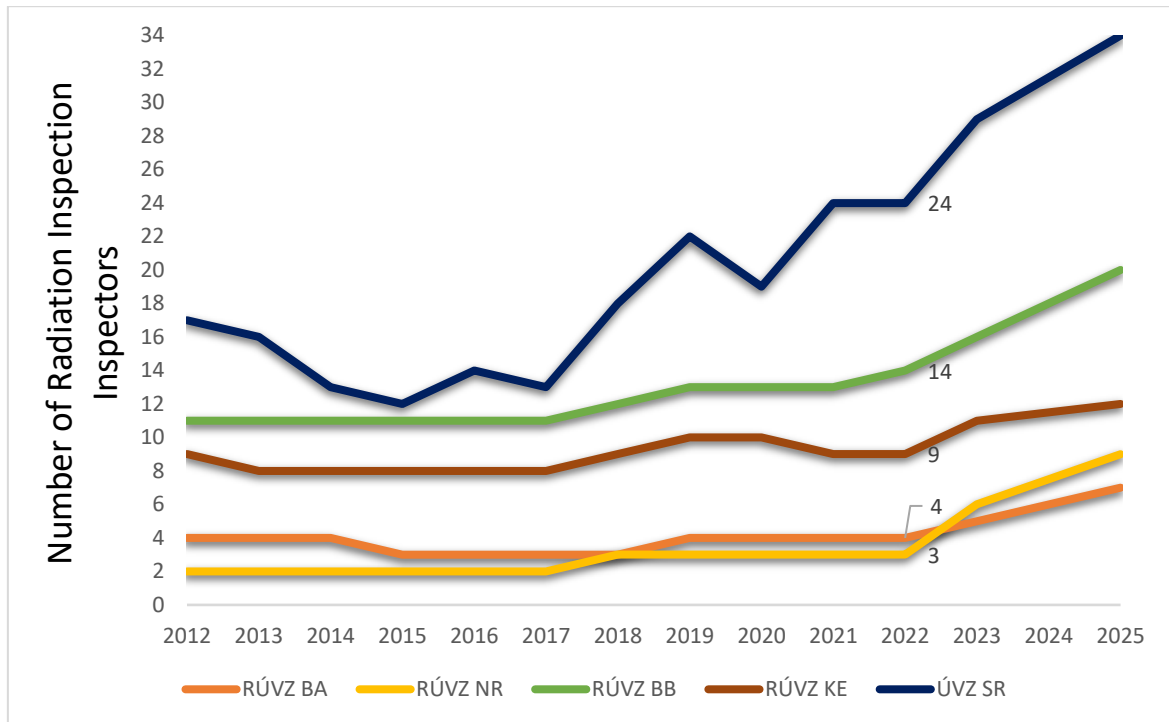


Fig. 21 Headcount of staff of radiation protection bodies

E.2.2.4 International Cooperation

ÚVZ SR is the Contact Point for communication with the International Atomic Energy Agency in the field of radiation protection and cooperates with ministries and other central state administration bodies, with the bodies of the European Union, with the competent authorities and institutions of other Member States of the European Union and represents the Slovak Republic in the bodies of the European Union and international organisations in the field of radiation protection. ÚVZ SR further ensures international cooperation in the field of radiation protection, including the fulfilment of obligations of the Slovak Republic arising from international treaties to which the Slovak Republic is bound, monitors the fulfilment of obligations arising from international treaties and participates in the solution of national and international programmes of importance for radiation protection.

Radiation protection officers in international cooperation:

a) with the European Union

participate regularly in the meetings of expert groups of the Council of the European Union and the European Commission with a view to exchanging knowledge on the assessment of the level of radiation protection in Europe and participate in the development of EU legislation in selected areas;

b) with the International Atomic Energy Agency

as members of the committees of the International Atomic Energy Agency, cooperate on international projects and regional projects related to radiation protection, provide internships of foreign experts in the Slovak Republic, seminars, workshops and training courses with broad international participation,

c) with the United Nations

represent the Slovak Republic on the United Nations Scientific Committee on the Effects of Ionizing Radiation,

d) with the World Health Organisation

having the role (24 hours a day) of the National Focal Point, which is established in the Department of Radiation Protection to fulfil the obligations arising from international health regulations,

g) with the Association of European Radiation Protection Authorities

represent the Slovak Republic on its Board of Directors, committees and expert working groups.

Radiation protection officers continue to cooperate on radiation protection issues with the Atomic Energy Agency of the Organisation for Economic Co-operation and Development, the Food and Agriculture Organisation of the United Nations and the Member States of the European Union and other countries in Europe and worldwide, and regularly participate in formal bilateral negotiations (based on international treaties), informal co-operation with all neighbouring countries, as well as with other countries. Cooperation is aimed at exchanging experience in the field of radiation protection.

E.2.3 Occupational Health and Safety Regulation

E.2.3.1 Role of the regulatory body

State administration in the field of labour inspection is executed by:

- a) Ministry of Labour, Social Affairs and Family of the Slovak Republic;
- b) National Labour Inspectorate;
- c) Regional Labour Inspectorate Nitra, it oversees compliance with the legal regulations and other regulations to ensure occupational health and safety at the workplaces of a nuclear installation on the whole territory of the Slovak Republic.

Within the scope of Act No. 125/2006 Coll. on labour inspection, labour inspection means:

- a) Supervision of compliance (among others) with:
 1. employment regulations governing labour relations;

2. legal regulations and other regulations to ensure occupational health and safety, including regulations governing factors of working environment,
 3. legal regulations which regulate the ban on undeclared work and illegal employment,
 4. obligations arising from collective agreements and other;
- b) imposing liability for infringements of the rules referred to in point a);
- c) the provision of free advice to employers, natural persons who are entrepreneurs and who are not employers, and employees on basic technical information and advice on how best to comply with the rules laid down in point a).

Obligations of the operator of nuclear installations, legal entities and natural persons vis-à-vis bodies of labour inspection arise from the Act No. 124/2006 Coll. on occupational health and safety, Act No. 125/2006 Coll. on labour inspection and the implementing regulations to the given acts (listed in Annex VI.).

E.2.3.2 Activity of Nitra Labour Inspectorate

It ensures the implementation of labour inspection within the scope provided for by Act No. 125/2006 Coll. on labour inspection and the implementation of supervision according to a special regulation, in particular it supervises whether the requirements of labour protection are met, e.g.:

- Selection, location, arrangement, use, maintenance and control of the workplace, working environment, work equipment;
- Workflows, working time, organization of labour protection and system of its management;
- Investigates the causes of occupational accidents causing death or serious injury, the imminent threat of a major industrial accident, safety, technical and organizational causes of occupational diseases and threat of an occupational disease, keeps records on them and if necessary, investigates the causes of occupational accidents,
- applies, by means of a binding opinion, the requirements for ensuring safety and health at work when permitting and approving buildings and their alterations,
- Withdraws authorization, certificates, licenses issued or documents to a natural person or a legal entity for performing activity according to special regulations;
- Discusses offences, takes decisions on imposing fines for offences and on ban of activity according to special regulations.
- Verifies compliance with the scope and conditions of authorizations, certificates and licences issued under this law and special regulations,
- Decides to impose fines under Sections 19 and 20 and under special regulation.

Within the scope of competences given by Act No. 125/2006 Coll. on Labour Inspection, the Labour Inspectorate Nitra supervises at all workplaces of nuclear installations throughout the Slovak Republic.

The Labour Inspectorate is independent in performing labour inspections and executes labour inspections through labour inspectors.

In addition to typical labour inspection activities, the Labour Inspectorate Nitra also carries out labour inspections of occupational safety and health at work, including the safety status of pressure, lifting,

electrical and gas technical equipment within the meaning of MPSVR SR Decree No. 508/2009. It also carries out labour inspections on technical equipment which are designated products after they have been placed on the market or made available on the market or after they have been put into service.

Types of technical equipment are classified according to the degree of hazard into Group A, Group B or Group C. Group A includes technical equipment with a high hazard rate, Group B includes technical equipment with a higher hazard rate and Group C includes technical equipment with a lower hazard rate. Group A and Group B technical installations shall be considered as dedicated technical installations.

The Labour Inspectorate Nitra performs the annual task of checking compliance with legal and other regulations to ensure OSH and security of technical equipment at workplaces with installed nuclear equipment.

The main focus of this task is the control of compliance with the Act No. 124/2006 Coll. on occupational health and safety at work (OHS Act), and the MPVSR SR Decree No. 508/2009, laying down details for ensuring health and safety at work with pressure, lifting, electric and gas technical equipment, and specifying technical equipment, which is considered as classified technical equipment and relevant Government regulations.

The primary objective of the labour inspection within this task is to check the OHS status during the preparation and realization of new buildings, the overhaul of NPP Units and participation in the putting of buildings and equipment into service.

Annually IP Nitra sends to the NIP a summary report covering the nuclear power industry, evaluating the state of OHS.

E.2.3.3 Methods of supervision by the labour inspection body

During inspection, the labour inspector is authorized in particular:

- Enter freely and at any time the premises and the workplaces that are subject to labour inspection (*pursuant to Act on Labour Inspection – Act No.125/2006 Coll., there is no special regime as labour inspectors are authorised to enter freely and at any time premises and workplaces subject to labour inspection*),
- Perform control, test, investigation and other acts aimed at establishing whether the regulations to ensure occupational health and safety are complied with;
- Request documents, information and explanations relating to application of regulations to ensure occupational health and safety;
- Request submission of documentation, records or other documents necessary for labour inspection purposes and to request copies thereof;
- Take the necessary samples of materials or substances that are used or which are being handled, for the purposes of analysis,
- Request proof of identity from an individual being at the workplace of an employer and to ask for explanation for the presence.

Based on the results of labour inspection and the severity of facts found, the labour inspector is entitled (among others) to:

- Propose technical, organizational and other measures necessary to remedy the situation,
- Order removal of identified deficiencies within the time limits specified,
- Prohibit the use of work facilities and operating facilities, premises and workplaces, machinery, equipment and other technical devices and means of work, working practices, substances and the carrying out of activities and work which immediately endanger the safety and health of employees and other persons staying on the employer's premises or at the employer's workplace with the employer's knowledge,
- Order that the site or part of the site be maintained in its original condition until the investigation is completed, or document the condition of the site or part of the site,
- Order measurements, inspections, tests and other necessary measures,
- Impose fines for offences under special regulation and other.

The Labour Inspectorate Nitra is authorised to carry out labour inspections at workplaces of nuclear installations with a focus on the control of measures for the prevention of serious industrial accidents, the state of health and safety at work, the security state of technical equipment, relevant documentation, accompanying technical documentation, periodic tests of dedicated technical equipment, labour and wage regulations, control of social legislation in transport, market surveillance of designated products and control of illegal work and illegal employment. *If deficiencies are found in the inspected employer or the inspected natural person who is an entrepreneur and is not an employer, the labour inspector is obliged to draw up a report and discuss it with the employer or the employee authorised by the employer or with the natural person who is an entrepreneur and is not an employer.*

On the result of the labour inspection, the labour inspector proposes measures, imposes measures and obligations to take measures to eliminate the detected violations of regulations and their causes and the obligation to submit to the Labour Inspectorate Nitra information on the implementation of measures to eliminate the detected violations.

F General Safety Provisions

The licensee according to Atomic Act (Act No.541/2004 Coll.) is obliged to establish the necessary organizational structure, to define the responsibilities, professional competencies, procedures and resources to ensure quality of nuclear installations and general safety provisions. In compliance with the Atomic Act, the licensee is obliged to ensure nuclear safety, physical protection, emergency preparedness, including their verification, to comply with the documentation reviewed or approved by the ÚJD SR, to adhere to the limits and conditions of safe operation or limits and conditions of safe decommissioning. Further the licensee is obliged to comply with the technical and organizational requirements provided by the generally binding legal regulations.

The licensee may entrust the performance of work activities only to persons fulfilling the conditions specified in Section 24 of Act No. 541/2004 Coll. (Atomic Act) and in accordance with the ÚJD SR Decree No. 52/2006 on professional competence (ÚJD SR Decree No. 52/2006) (last amended with effect from 1 January 2024) shall identify 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 system documentation.

F.1 Responsibility of the Licence Holder

Article 21 of the Joint Convention

Responsibility of the licence holder

1. *Each Contracting Party shall ensure that prime responsibility for the safety of spent fuel or radioactive waste management rests with the holder of the relevant licence and shall take the appropriate steps to ensure that each such licence holder meets its responsibility.*
2. *If there is no such licence holder or other responsible party, the responsibility rests with the Contracting Party, which has jurisdiction over the spent fuel or over the radioactive waste.*

F.1.1 Principles and Definition of Nuclear Safety and Radiation Protection

According to Act No 541/2004 Coll. (Atomic Act), nuclear safety means the technical condition and capability of a nuclear installation or a transport facility, as well as the capability of its operators to prevent the unauthorised release of radioactive substances or ionising radiation into the working environment or the environment, and the capability to prevent events and mitigate the consequences of events in nuclear installations or in the transport of radioactive materials.

The licence holder shall be liable for nuclear safety.

Radiation protection is defined under the Act No. 87/2018 Coll. on Radiation Protection as a system of technical measures or organisational measures to limit the exposure of natural persons to the effects of ionising radiation.

The licence holder is obliged to observe the basic principles of radiation protection, requirements to ensure radiation protection of staff and residents during activities leading to exposure and to limit generation of RAW to the necessary extent.

In the use of nuclear energy, a level of nuclear safety, reliability, occupational health and safety and safety of technical installations, radiation protection, physical protection, emergency preparedness and fire protection must be achieved such that the risk to life, health, occupational safety or the environment is as low as is reasonably achievable according to the available knowledge, while radiation exposure limits must not be exceeded. When significant new information on the risks and consequences of the use of nuclear energy becomes available, that level must be reassessed and the necessary measures must be taken to comply with the terms of the Atomic Act.

Detailed principles of SNF and RAW management are specified in chapters G and H.

In Slovakia it is possible to dispose only RAW that is produced on its territory.

Pursuant to Section 34 of Act No. 87/2018 Coll. on Radiation Protection, it is forbidden to import radioactive waste not produced in the Slovak Republic, for incineration.

In case of shipments of RAW and SNF produced in Slovakia, for treatment or reprocessing in a Member State or a third country, the ultimate responsibility for safe disposal of these materials, including waste, which is generated as a by-product, is the Slovak Republic.

Radioactive waste produced in the Slovak Republic can be disposed in another Member State or a third country only on the basis of an international treaty concluded between SR and that other state or a third country, which will enter into force no later than at the time of shipment of radioactive waste and which takes into account the recommendations of the European Community for Atomic Energy, in accordance with Sections 16 to 16l, Section 21 (13) of Act No. 541/2004 Coll. (Atomic Act).

F.1.2 Nuclear Safety and Radiation Protection Policy

The purpose of the NI safety policy for licence holders is to establish safety objectives, requirements, principles, responsibilities, measures and methods of implementation for all safety areas such as nuclear safety and radiation protection, environmental safety, operational safety, technical security, facility *security* and physical security, occupational health and safety and fire protection, integrated information system and telecommunications network security, protection of classified information, crisis planning and civil protection, personnel security, administrative security, financial security, protection of the company's reputation and business continuity planning.

The safety policy is enforced by internal governing acts, as well as by monitoring compliance with them at all levels of the company's management.

Compliance with and fulfilment of the safety policy content by all employees is one of the main priorities and objectives; Safety is an integral part of all activities.

To achieve the safety objectives, the main safety requirements and principles of nuclear safety and radiation protection are set out:

- Nuclear safety and radiation protection is overriding and superior over any other interests of the company.

- Every employee is liable for nuclear safety and radiation protection in the scope of his competencies, responsibilities and duties.
- The principles of safety culture apply in all activities relating to nuclear installations.
- Principles of defence-in-depth strategy: multi-level, mutually overlapping measures, focused mainly at prevention, but also at accident mitigation, are applied in nuclear installation designs and activities related to the operation of nuclear installations.
- Systems and components of relevance to safety are periodically tested with the aim to verify their functionality and serviceability.
- Safety audits of the respective safety systems are conducted on a periodical basis.
- Integrated Management System (IMS) is built in accordance with the requirements of the Slovak legislation, regulatory authorities, IAEA recommendations and the requirements of the Slovak Technical Standards STN EN ISO 9001:2016 Quality Management Systems. Requirements of STN EN ISO 14001:2016 Environmental Management Systems. Requirements and instructions for use, STN ISO 45001:2018 Occupational Health and Safety Management Systems. Requirements with guidance for use, and *ISO/IEC 27001:2013 Information Security Management System*.
- The latest knowledge and experience from operation of nuclear installations in the country and abroad are continuously applied.
- International assessments and reviews are regularly used for independent review of nuclear safety and radiation protection level.
- An open dialogue with the public, local and regional state administration and self-governing authorities is applied.
- Currently occurring safety risks concerning nuclear safety and radiation protection are identified, analysed, classified, and managed across all management levels. More serious hazards are submitted to the Nuclear Safety Committee, an advisory body of the top management of the licence holder.
- Operators invest adequate material and financial means to deliver the safety goals and meet the safety requirements, fundamentals and principles of nuclear safety and radiation protection, and to enhance training and qualification of employees.

The primary responsibility for nuclear safety and radiation protection is with the specific persons listed as statutory body of the licensees (Boards of Directors of joint stock companies), who determine and pursue the application of the main goals, requirements, fundamentals and principles of nuclear safety and radiation protection in all activities related to the nuclear installations, from their siting, design, construction, commissioning, operation until decommissioning, including management of SNF and RAW. The obligations following the primary responsibility are delegated to the executive management through authorization of persons and the description of the organizational rules of the company.

F.1.3 Obligations of Licence Holders towards Regulator

The licence holder is obliged to provide for sufficient financial and human resources to ensure nuclear safety, including the necessary engineering and technical support in all areas related to nuclear safety. The licence holder shall give priority to safety aspects over all other aspects of the authorized activity.

The obligations of the licence holder are given mainly by the laws listed under E.1.2.2.

Any modifications to nuclear installation affecting nuclear safety during construction, commissioning, operation, decommissioning, closure of repository or after closure of repository may be implemented only after a preceding approval or authorisation of relevant regulatory authorities has been obtained and in special cases after having obtained the statement (opinion) of the European Commission. Other modifications must be notified by the operator, or submitted for review.

The licence holder shall issue operating procedures for the performance of activities at a nuclear installation, in particular service, maintenance, control and testing of classified equipment. These procedures shall be in accordance with the conditions of the authorization. The licence holder shall update and complete these procedures according to the current state of the nuclear installation.

The licence holder has the obligation to report to the regulatory authorities events at nuclear installations and in case of incidents and accidents also to other organizations and to the public, to take action to prevent recurrence.

The licence holder has the obligation to provide information to the public on nuclear safety. This obligation does not change the responsibility of ÚJD SR to provide the public with its own independent assessment.

In practice, the licence holder of a nuclear installation uses other essential specialized organizations, in the field of maintenance, operation or research. These specialized organizations have the function of technical support organizations and are involved through their activities in supporting reliable and safe operation of nuclear installations, since the works, which they carry out, cannot be provided for by the licence holder with in-house human resources, nor in organizational, technical and knowledge terms.

The licence holder is given the obligation to identify for all RAW a suitable system for their treatment in at least two alternatives justifying the choice of one of them.

In order to ensure nuclear safety during the commissioning of a nuclear installation and during its operation, the licence holder is obliged to hand over the RAW no later than one year after their generation and the SNF immediately after meeting the requirements for its safe transport and storage to a legal entity - JAVYS, a. s. - authorised by the MH SR and permitted by the Authority, for further handling.

The producer of RAW is responsible for safe management of RAW in accordance with the national Programme up to the point of being accepted to the repository, and the safety of the RAW facilities is the responsibility of the RAW authorisation holder.

The licence holder's responsibility is to check and verify before closing the repository its readiness and also the readiness of the staff and the compliance of the documentation with its current status.

F.2 Human and Financial Resources

Article 22 of the Joint Convention

Human and Financial Resources

Each Contracting Party shall take the appropriate steps to ensure that

- i) Qualified staff are available as needed for safety related activities during the operating lifetime of a spent fuel and radioactive waste management facility;*
- ii) Adequate financial resources are available to support the safety of facilities for spent fuel and radioactive waste management during their operating lifetime and for decommissioning;*
- iii) Financial provision is made, which will enable the appropriate institutional controls and monitoring arrangements to be continued for the period deemed necessary following the closure of a disposal facility.*

F.2.1 Human Resources

Quality human resources are an essential prerequisite for the safe, reliable, economical and environmentally sound operation of nuclear installations. The term "high quality human resources" within the meaning of Act No. 541/2004 Coll. (Atomic Act) means the totality of professional, health and mental capacity of staff to perform the work in NIs. In terms of the impact of work activities on nuclear safety, the staff of the licence holder is divided into two groups:

- Employees having direct impact on nuclear safety – licenced employees, whose special competence is verified by an exam (written exam, oral exam and verification of competences on a representative full-scale simulator), and a practical test for licenced employees before an examination commission established by ÚJD SR, which issues Licence of special competence (currently this category is no longer in JAVYS, a. s.),
- Employees with impact on nuclear safety – professionally competent employees, whose Professional competence was verified by a panel established by the operator of specialized facility in a form of written and oral exam and to whom Certificate of Professional competence has been issued.

Special competence of employees according to the Atomic Act (Act No.541/2004 Coll.) means a set of expertise, practical experience, principal attitudes and knowledge of generally binding legal regulations and operating procedures issued by the licensee to ensure nuclear safety that is necessary for performing work activities having direct impact on nuclear safety.

Professional competence means a complex of professional knowledge, practical experience, knowledge of generally binding legal regulations and operating procedures issued by the licensee, necessary to perform work activities by the employee of a licensee. Professional competence is acquired by successful completion of Professional training at a specialized facility.

The overall working (professional, health and mental) competency of staff to carry out working activities at nuclear installations is the responsibility of the licensee. The licensee authorizes his personnel to

perform working activities. An “Authorization to Perform Working Activities“ as part of the IMS for quality assurance of a nuclear installation – a licensee. The Authorization to Perform Work Activities is issued for a given position and specific nuclear installation only for those selected and professionally competent employees of the licence holder, who have valid Licences of Special Professional Competency or Certificates of Professional Competency *and maintain their competence at the required level*. The authorisation is a proof of the employee’s competence in relation to the supervisory authorities.

Each position within the system of professional training has defined requirements for education, experience, professional training, health or mental capabilities. The direct supervisor of the employee is responsible for meeting these requirements.

The training system for the licence holder's staff is updated based on operational experience, implemented organisational changes, technical solutions (upgrades) at the facility, requirements of the regulatory authorities, IAEA audits, inspections and recommendations, *and changes in legislation*. It is provided with the necessary human, financial and material resources.

The training of both the licence holder's employees and third parties (third parties being contractors) shall be carried out in accordance with the quality assurance programme management documents, established and maintained in accordance with:

- Generally binding legal regulations of the Slovak Republic,
- The IAEA *safety standards*,
- Slovak Technical Standards STN EN ISO 9001:2016 Quality Management Systems. Requirements of STN EN ISO 14001:2016 Environmental Management Systems. Requirements with instructions for use STN ISO 45001:2018 OHS Management Systems. Requirements with guidance for use, and *STN EN ISO/IEC 27001: 2023 Information security, cyber security and privacy protection. Information security management systems. Requirements (ISO/IEC 27001: 2022)*,
- Management documentation in IMS.

Schematic diagram of the staff training system:

- *Technical standards* STN EN ISO 9001:2016, STN EN ISO 14001:2016, *STN ISO 45001:2018* and STN ISO/IEC20000-1:2014,
- Management documentation in the Quality System.

Diagram of the system of staff training:

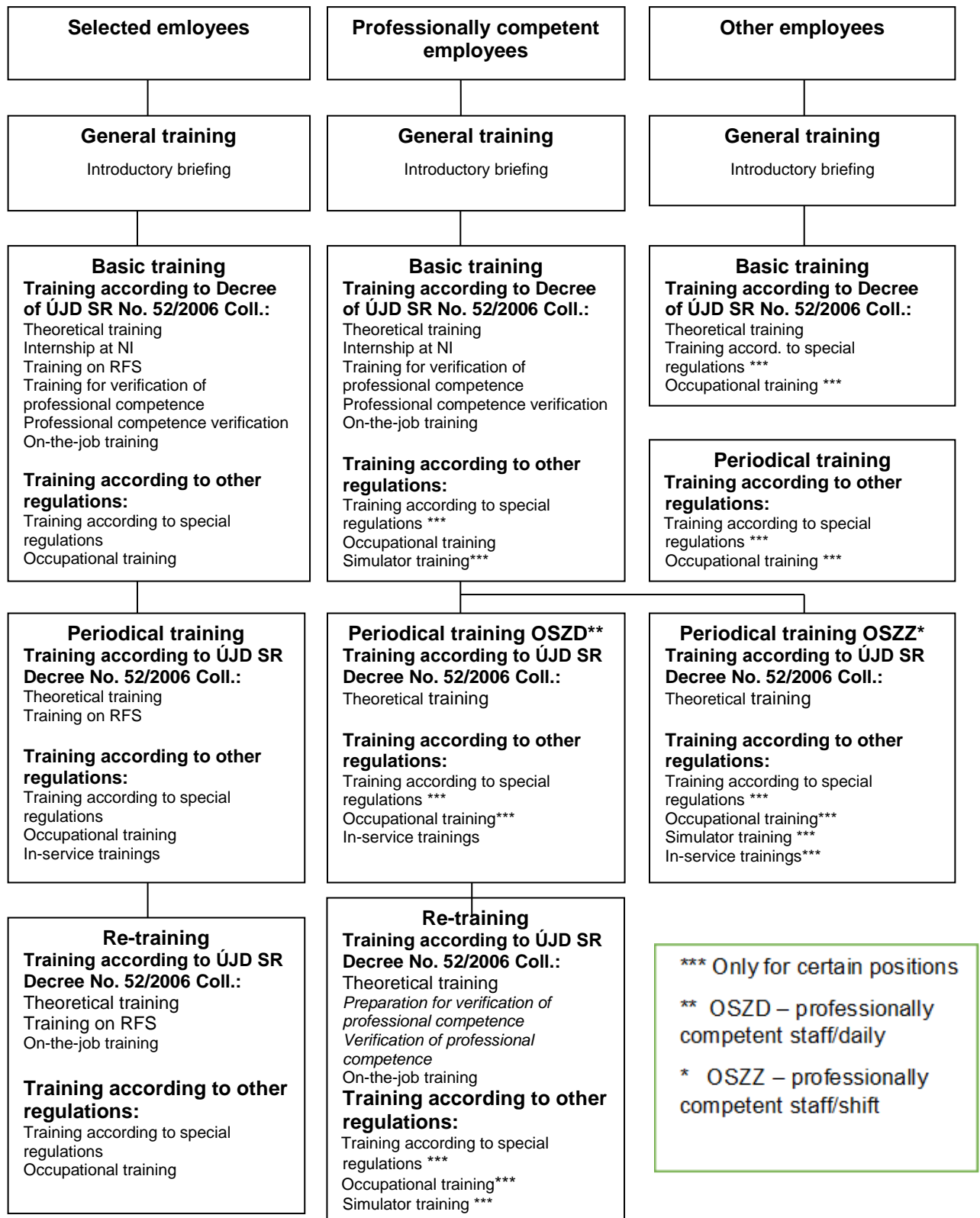


Fig. 22 Chart of Professional training system for employees

In terms of their impact on nuclear safety, the employees are classified into the appropriate type and phase of training and divided according to their activities into *ten* categories, which are further subdivided into professional groups, according to their professional focus in SE, a. s.:

<p>Category I: Selected employees performing work activities with direct impact on nuclear safety:</p> <ul style="list-style-type: none"> ▪ Secondary circuit operator ▪ Primary circuit operator ▪ Head of reactor unit ▪ Shift supervisor ▪ and professionally competent staff performing work activities with impact on nuclear safety, such as: ▪ Lecturer for RP simulator training ▪ Specialist for nuclear safety analyses/<i>Senior, ZVZ</i>
<p>Category I-: Professionally competent staff performing work activities with impact on nuclear safety:</p> <ul style="list-style-type: none"> ▪ Safety management engineer – nuclear safety ▪ Equipment reliability specialist ▪ System engineer/<i>Senior</i> ▪ Project engineer ▪ Basic design configuration specialist
<p>Category II+: Professionally competent staff performing work activities with impact on nuclear safety:</p> <ul style="list-style-type: none"> ▪ Safety management engineer ▪ Component engineer/ <i>Senior</i> ▪ Equipment/simulator administration technician
<p>Category II: All other professionally competent staff – management employees, specialists, engineers, technicians, technologists, foremen, or others, performing managerial, technical, engineering, control, maintenance activities with impact on nuclear safety.</p>
<p>Category III: – professionally competent staff – field operator, locksmiths, electricians, mechanics, radiation control technicians and other, performing operator, maintenance and control activities with impact on nuclear safety.</p> <p><i>Category CM. – professionally competent staff designated for the pre-commissioning phase of MO3 and MO4. The MO3,4 staff: electricians, mechanics, technicians, specialists, managerial staff and others, performing work having impact on NS.</i></p>
<p>Category F – selected employees performing work activities with direct impact on nuclear safety:</p> <ul style="list-style-type: none"> ▪ Control physicist
<p>Category S – selected employees performing work activities with direct impact on nuclear safety:</p> <ul style="list-style-type: none"> ▪ Scientific head for start-up without the right of handling
<p>Category M – professionally competent staff – managerial staff performing work activities with impact on nuclear safety:</p> <ul style="list-style-type: none"> ▪ Section and Plant Directors ▪ <i>Project Manager</i> ▪ <i>Section Director – improvement and digitalisation</i> ▪ <i>Deputy Director of NPP Section</i> ▪ Managers of centralized units ▪ Senior staff of Procurement Section 30000 ▪ <i>Deputy Project Director</i> ▪ <i>Deputy Project Director for Start-up and future operation</i>
<p>Category T – Foreign professionally competent staff performing work activities with impact on nuclear safety in non-managerial positions (technicians, technologists, specialists, etc.).</p>
<p>Category VI – other staff performing work without impact on NS.</p>

Fig. 23 Categories of employees of the licensee, SE, a. s.

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

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

- Division directors,
- *Section manager*,
- *Department manager*,
- *Team Leader*,
- Technical-administrative staff (technicians, technology experts, specialists, clerk),
- Foremen,
- Operators and maintenance staff.

Category V (.a-.e) includes competent staff from profession groups of the licence holder, performing work *with impact on nuclear safety* and associated with the operation of nuclear facilities of TSÚ RAO, MSVP, RÚ RAO, IS RAO and FS KRAO and with the decommissioning of NPP A-1 and NPP V-1.

Staff performing activities related to the operation of TSÚ RAO, MSVP, IS RAO, RÚ RAO, FS KRAO and decommissioning of NPP A1 in phase III and IV.

- V. a) heads and managerial staff, specialists and technical-administrative staff of asset management, technical and operational units,
- V. b) executive staff of asset management units, technical and operational units;

Staff performing activities in phase II of decommissioning of NPP V1

- V. c) heads and managerial staff, specialists and technical-administrative staff of asset management, technical and operational units of NPP V1,
- V. d) executive staff of asset management units, technical and operational units of NPP V1;

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

- V. e) heads and managerial staff, specialists and other professionally competent staff performing work common for all NIs at JAVYS, a. s.

Other staff (with no impact on NS)

Other employees carrying out work activities with no impact on nuclear safety are not included in the training under the Atomic Act. They may undergo training if their work activities require a basic knowledge of the operation and decommissioning of NIs and of technical terms. Training of other personnel takes place in a specialised facility.

Operator of a Specialized Facility

Training of staff of the licence holder and if needed also of contractor staff, is provided at the operator of a specialized facility, which is a licence holder for training of staff of the relevant licence holder, to be issued by the ÚJD SR based on an application and after assessing the technical equipment used for training to provide professional competence for the staff of the applicant. The training is performed in accordance with the ÚJD SR Decree No. 52/2006, and with the approved system of training of staff of the licence holders and according to the relevant training programs for professionally competent staff or selected staff, developed by the operator of the specialized facility. Special technical equipment in the

specialized facility is the representative full-scale simulator of a reference Unit of operated NI (RFSS of NI⁴). In Slovakia there are three RFSSs:

- RFSS of EBO in VUJE, a. s., ŠVS – in operation and Unit 3 of EBO is a reference Unit,
- RFSS of EMO at NI EMO site – in operation and Unit 1 of EMO is a reference Unit,
- RFSS of MO 3, 4 at NI EMO site – *in operation* and Unit 3 of MO is a reference Unit.

The main upgrade on the RFSS (representative full-scale simulator) in EMO was in 2013, during which the control computer and the core model were replaced, and inconsistencies with the relevant Unit that have been identified during the trainings and regulator's inspections for the last 10 years, have also been eliminated. A similar upgrade was successfully implemented in 2013 and 2014 also on the RFSS EBO in VUJE, a. s. In 2019 – 2020, the RFSS of the MO3,4 was renewed for the needs of commissioning of Unit 3 of EMO.

Professional competence to carry out activities leading to radiation exposure within the meaning of Act No 87/2018 Coll. on radiation protection

The professional competence of a radiation protection representative is a condition for the issue of an authorisation to carry out activities leading to radiation exposure and to provide services and activities relevant to radiation protection. Professional competence shall be demonstrated by the required education and professional experience, completion of training and successful completion of an examination before a commission established by the ÚVZ SR and obtaining a Certificate of Professional Competence.

The required qualifications and professional experience of a radiation protection representative for issuing an authorisation for activities leading to radiation exposure carried out in a nuclear installation shall be the completion of a second level university degree in a natural science or technical discipline and at least 3 years of professional experience.

Vocational training and a refresher training are part of continuing vocational training and their scope is established by Act No. 87/2018 Coll. on radiation protection.

Refresher training is required every 5 years for every person holding a certificate of competence.

Vocational training and refresher training consists of a general part and a specific part.

The general section is aimed at acquiring knowledge of legal regulations, knowledge of the properties and harmful effects of ionising radiation, methods of health protection against ionising radiation, basic principles and procedures of radiation protection, organisation of work and documentation requirements.

The specific section focuses on specific issues depending on the nature of activity leading to exposure or service important for radiation protection.

The content of the general section and the specific section of the training and the extent of knowledge and expertise to be demonstrated for the proficiency test, is regulated by the relevant radiation protection authority in a Statute, and the requirements are published on its website.

Training in radiation protection can only be provided by a natural person – entrepreneur or a legal entity holding a licence issued by the ÚVZ SR.

According to Act No. 87/2018 Coll. on radiation protection, for a person taking a position with direct responsibility also requires completed training.

The person with direct responsibility is required to undergo refresher training to a specified extent every five years from the date of completion of his/her vocational training.

If the person with direct responsibility has not undergone refresher training, he/she cannot carry out continuous supervision in nuclear installations.

To ensure continuous supervision at the workplace, the operator shall designate an appropriate number of persons with direct responsibility for radiation protection, in particular by ensuring that workers at work comply with the safety, technical and administrative requirements for radiation protection. In determining the number of persons with direct responsibility, account shall be taken of the number of working shifts in the plant and the location and accessibility of workplaces with sources of ionising radiation.

The operator of a nuclear installation is also required to inform workers, including students, about:

- a) the nature and extent of the potential health hazard, the risks associated with their work and the potential health harm associated with exposure,*
- b) general procedures for ensuring radiation protection,*
- c) procedures corresponding to the operating and working conditions applicable to the given activity leading to exposure in general and to the workplace and work, to which they may be assigned,*
- d) the relevant parts of the plans, procedures and measures in the emergency response system,*
- e) the importance of complying with the health, technical and administrative requirements of radiation protection,*
- f) the importance and need for early notification of pregnancy due to the risk of exposure of the foetus,*
- g) the importance of notification of the intention to breastfeed the infant, in view of the possible risks of exposure of the infant following the intake of radionuclides or following physical contamination, if the female worker, who is breastfeeding, may become contaminated with a radioactive substance at work.*

The operator is obliged to keep records on trainings and verification of knowledge of the staff.

F.2.2 Financial Resources

One of the principles of nuclear and radiation safety of operators is the commitment to have necessary financial means to meet nuclear and radiation safety and to provide for continuous training and improvement of qualification of the staff. In order to fulfil this commitment, financial strategies of companies were developed that would enable, among the tasks mentioned, also fulfilment of the program for technological development.

Financing RAW, SNF Management and Decommissioning of NIs

The method of financing the management of RAW, SNF and decommissioning of nuclear installations is regulated by Act No. 308/2018 Coll. on the National Nuclear Fund. Government Ordinance No. 478/2022, stipulating the amount of annual levy intended for covering the historical debt from the supplied electricity to the end customers, and details of the method of its collection for the National Nuclear Fund, its use and on the method and deadlines for the payment. Government Ordinance No. 478/2022 (previous No.22/2019), effective from 1 January 2023, stipulates the amount of mandatory contribution and mandatory payment, and details on the method and payment of mandatory contribution and mandatory payment to the account of the National Nuclear Fund. The purpose of the Nuclear Fund

is to provide financing of activities related to the national program for the management of SNF and RAW (hereinafter referred to as “National Programme”), to collect and manage funds intended for the back-end of the peaceful use of nuclear energy cycle, to secure funds from the state budget for the management of nuclear materials of unknown origin, and to administer financial security for high-activity sources in accordance with a special regulation.

Fund resources are funds paid as:

- a) Mandatory contributions,
- b) Mandatory payments,
- c) transfer from the expenditure budget account of the MH SR, as a levy collected by the transmission system operator and a distribution system operator (hereinafter referred to as “System Operator”), to cover historical debt (hereinafter referred to as “levy”); The levy is a part of the price of electricity supplied to end customers,
- d) fines and sanctions imposed by ÚJD SR according to a special regulation,
- e) earnings on deposits on the Nuclear Fund accounts,
- f) voluntary contributions from natural and legal persons,
- g) subsidies and contributions from European Union funds and from other international organizations, financial institutions and funds provided to cover the cost of the back-end of the peaceful use of nuclear energy,
- h) subsidies from the state budget intended to cover the necessary costs incurred for the management of nuclear materials of unknown origin and for the management of radioactive materials of unknown origin, these subsidies being provided in full; If the originator of these materials and wastes is subsequently identified, a special regulation shall be followed,
- i) subsidies from the state budget provided for reasons other than under par. h) on the basis of a Government Decision,
- j) proceeds from financial operations,
- k) other resources, if so provided by a special regulation or an international treaty, by which the Slovak Republic is bound,
- l) fees from legal entities or natural persons – entrepreneurs applying for an authorisation or holders of authorisation for activity leading to exposure,⁴⁾ who will handle a high-activity source in accordance with a special regulation,²⁶⁾ representing a financial security in the amount determined by an authorized organization, holder of a permit from the ÚVZ SR according to a special regulation.

At present, the basic (majority) resources of the Fund are the mandatory contributions and payments of license holder and a transfer from the expenditure budget account of the MH SR, as well as levies collected by the transmission system and distribution system operators.

The Fund creates special-purpose sub-accounts and analytical accounts in the following structure:

- a) sub-account for decommissioning of nuclear installations operated at the Jaslovské Bohunice site including the RAW management from their decommissioning, structured as analytical accounts:
 1. NPP A1,
 2. NPP V1,

3. NPP V2,
- b) Sub-account for the decommissioning of nuclear installations, including RAW management from this commissioning, operated at Mochovce site in the structure of the following analytical accounts:
 1. NPP Mochovce 1, 2,
 2. NPP Mochovce 3, 4,
 - c) Sub-account for decommissioning of other nuclear installations, including management of RAW from this decommissioning, which *are* commissioned after 1 January 2019.
 - d) Sub-account for management of nuclear materials of unknown origin and radioactive materials of unknown origin.
 - e) Sub-account for site search, geological survey, preparation, design, construction, commissioning, operation and closure of repositories for RAW or SNF, including site monitoring after closure of these repositories and related research and development, public involvement into decision-making processes, communication with the public, economic incentives for the sites concerned and the alleviation of the burdens caused by these activities in the structure of the following analytical accounts:
 1. RÚ RAO at Mochovce site,
 2. Deep geological repository,
 - f) Sub-account for institutional control of repositories,
 - g) sub-account for long-term storage of spent nuclear fuel in separate nuclear installations,
 - h) sub-account for reimbursement of expenses intended for the administration of the Nuclear Fund and expenses related to the management of the Nuclear Fund,
 - i) sub-account for security to cover the costs of handling disused high-activity sources,
 - j) sub-account for decommissioning nuclear installations other than nuclear installations for power generation and closure of RÚ RAO in the structure of the following analytical accounts
 1. Technologies for treatment and conditioning of radioactive waste including objects and facilities transferred here from NPP A1,
 2. Interim Spent Fuel Storage facility operated at the Jaslovské Bohunice site,
 3. Final treatment of liquid radioactive waste operated at the Mochovce site,
 4. Integral Radioactive Waste Storage facility operated at the Jaslovské Bohunice site,
 5. National RAW Repository operated at the Mochovce site,
 - k) Sub-account for collecting funds from fines and sanctions.

The resources of the Nuclear Fund arising from mandatory contributions or mandatory payments shall be held in relevant sub-accounts or analytical accounts, for which the mandatory contributions or mandatory payments are intended, together with income from the deposits of these funds in the accounts and yields from financial operation.

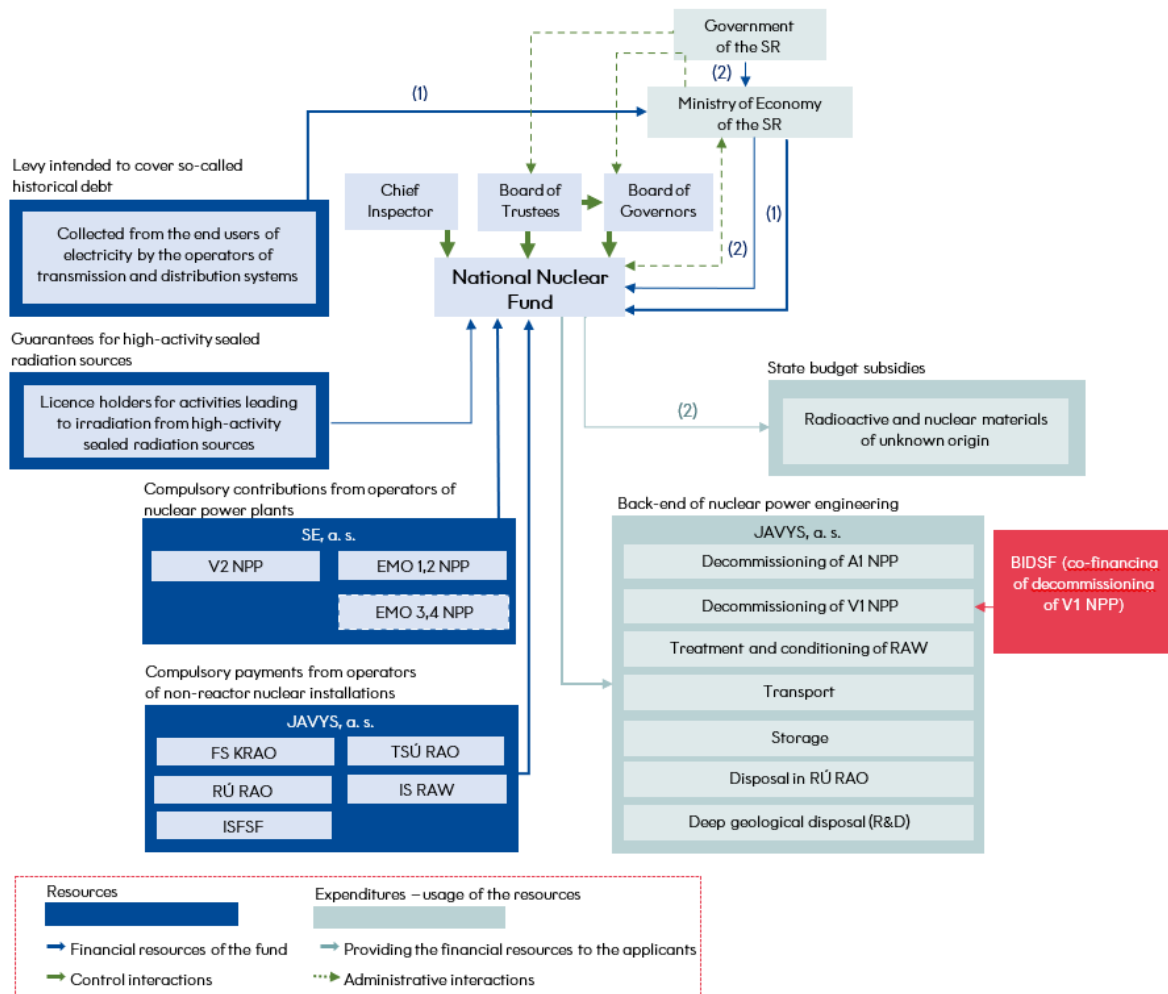


Fig. 24 Financing scheme for the back-end of the nuclear energy cycle

Funding from the Fund is provided based on applications. The applicant may be a licence holder for:

1. A phase of decommissioning of a nuclear installation,
2. Operation of a nuclear facility for RAW or SNF disposal,
3. Closure of a RAW repository or repositories and SNF and its institutional control,
4. RAW or SNF management,
5. Handling of nuclear materials within or outside a nuclear facility; or
6. Export of nuclear materials of shipments of radioactive materials including international transport.

The Nuclear Fund is obliged to use funds in accordance with the National Programme to cover eligible costs incurred for activities of the back-end of the peaceful use of nuclear energy cycle, and activities related to management of nuclear materials of unknown origin, radioactive materials of unknown origin and disused high-activity sources, up to the amount of accumulated funds, in particular for:

- a) elaborating the documentation to be submitted to the ÚJD SR for issuing authorisation for decommissioning of a nuclear facility,

- b) decommissioning of a nuclear facility including RAW management from that decommissioning,
- c) SNF management after the start of decommissioning of a nuclear facility,
- d) handling of nuclear materials of an unknown origin and handling of radioactive materials of unknown origin, where the originator or the current owner, according to the statement of the Police Investigator or the statement of the MZ SR, is not known; if the originator of nuclear material of an unknown origin or radioactive material of unknown origin is subsequently identified, is obliged to reimburse to the Nuclear Fund for the costs incurred in the handling of nuclear material or radioactive material,
- e) the purchase of land for the siting of RAW or SNF repository from the decommissioning of nuclear installations,
- f) site search, geological survey, preparation, design, construction, commissioning, operation and closure of RAW or SNF repositories, including their monitoring after the closure, institutional control of repositories and related research and development, reasonable costs for public involvement in related decision-making processes, reasonable costs of communication with the public, reasonable costs of economic stimulation of affected localities, and reasonable costs of alleviating the burdens caused by activities under this point,
- g) management and activities related to the management of Nuclear Fund up to 1% of the annual income of the Nuclear Fund,
- h) payment of insurance premiums for liability insurance of the operator of nuclear installation, which is in decommissioning, for damages caused by nuclear event,
- i) the management of disused high-activity sources and related activities from the signing of the proof of receipt of disused high-activity source by the authorized organization up to the amount of the contribution to the financial security,
- j) reasonable and purposefully spent costs to support training, qualification and expertise for the preservation and dissemination of knowledge, and support for research and development intended to deal with the back-end of the peaceful uses of nuclear energy cycle, the management of nuclear materials of unknown origin or radioactive materials of unknown origin, RAW produced during activities leading to exposure and the area of disused high-activity sources.

In the context of the accession of the Slovak Republic to the EU, both Units of NPP V1 were shut-down in 2006 and 2008 respectively, based on the decision of the Government of SR. Completion of the decommissioning of NPP V1 is planned by 31 December 2027.

The costs of decommissioning of NPP V1 are financed from the following sources:

- from Slovak resources (from levies paid to the National Nuclear Fund and from own resources of JAVYS, a. s.),
- from EU funds and other donors.

The purpose of providing financial assistance by the EU was to mitigate the economic and social impacts of the early shutdown of NPP V1. EU funds were provided through PHARE, and subsequently *the International Fund to Support the Decommissioning of NPP V1 (BIDSF)* managed by EBRD was

created, to which EU funds from the 2007 - 2013 and partly also from the 2014 – 2020 budget period were allocated. Since 2016, an *indirect a form of funding has been established through a national entity, the “National Path” administered through the national agency SIEA*, which along with EBRD, manages the new EU funds.

Initially, projects indirectly related to decommissioning were also supported, to mitigate the consequences of shutdown, especially in the areas of transmission system and energy efficiency. Since 2014, it is possible to allocate financial support exclusively for NPP V1 decommissioning projects.

From the resources of the National Nuclear Fund, the national funds are provided for the relevant year on the basis of approved applications for NPP V1 decommissioning, for co-financing of selected projects co-funded from the EU sources, to finance consideration for suppliers, to finance induced support costs of NPP V1 decommissioning, and other activities according to the possibilities specified in Act No. 308/2018 Coll. on the National Nuclear Fund.

The costs for the SNF and RAW management produced by operating NPPs (EBO V2, EMO 1,2, and MO 3,4) are covered directly by the holder of licence for operation of NPP (SE, a.s.), either in the framework of the operation of its own facilities or as a reimbursement for services provided by JAVYS, a.s. based on a contract (transports and storage of SNF, transports, storage, treatment and conditioning of RAW in the RÚ RAO).

F.3 Quality Management System of the licence holder

Article 23 of the Joint Convention

Quality Assurance

Each Contracting Party shall take the necessary steps to ensure that appropriate quality assurance programs concerning the safety of spent fuel and radioactive waste management are established and implemented.

Legislative requirements

The quality system always follows current national and international requirements and is based on:

- meeting the requirements of the legal standards of the Slovak Republic,
- compliance with IAEA recommendations,
- implementation of the internal needs of the company in building an effective management system.

Act No.541/2004 Coll. (Atomic Act)

Approval of the quality system documentation is a specific condition for the issue of approval or authorisation for the construction of a nuclear installation, its commissioning, operation, decommissioning, closure of a repository and other activities referred to in the Act.

The licence holder is obliged to establish the necessary organizational structure, procedures and resources for quality assurance (further referred to as “quality system”).

ÚJD SR Decree No. 431/2011 on the quality management system, in connection with the Act No. 541/2004 Coll. (Atomic Act) establishes details of requirements for the scope, content, hierarchy, structure and review of the quality management system of the applicant for the licence and of the licence

holder, as well as details of the requirements for the scope, content, hierarchy and structure of its documentation, details of the quality assurance requirements for nuclear installations, details of the quality assurance requirements for classified equipment and details of the scope of their approval.

The quality management system documentation is covered by STN EN ISO 9001:2016 Quality Management Systems. The requirements and any specific requirements are defined in the ÚJD SR Decree No. 431/2011.

The requirements for quality assurance are contained in programs of quality assurance:

- A Quality Assurance Programme for the nuclear installation, setting out the basic quality assurance requirements for all phases of the nuclear installation's lifetime.
- Staged quality assurance programme of nuclear installation, which includes requirements for a given stage of nuclear installation's lifetime (from design to decommissioning, in case of a repository up to its closure).

The requirements for quality assurance of classified equipment are specified in the quality plans for classified equipment.

The quality system of the licence holder is built and implemented in the form of an Integrated Management System (IMS). It is a management system that fulfils the requirements for OHS management, quality, environmental protection *and information security*, in accordance with the IAEA safety standard "*GSR Part 2 Leadership and management for Safety*".

In addition to the legislative requirements, which are binding, technical standards are considered to be the minimum recommended technical solution and compliance with them ensures that the user meets the requirements arising from them. *Pursuant to Section 3 (11) of Act No. 60/2018 Coll. on Technical Standardization, as amended by Act No. 297/2023 Coll., compliance with a Slovak technical standard (STN) or technical standardization information is voluntary (e.g. STN, European Standards (ES), international technical standards (ISO, IEC), manuals, internal standards (such as directives and orders)).*

Policies declared and implemented by the licence holder

The overall intentions and direction of action in the areas of quality, environment, OHS, safety and staff training are set out in the licence holder's policies:

- Integrated Management System Policy;
- Safety Policy;
- Staff training policy.

The top management sets **quality goals** to accomplish the quality policies. The goals are elaborated into specific tasks for the specific units *together with deadlines and responsibilities*.

The Quality Goals are also determined in order to assure safe, reliable, effective and environment friendly operation and decommissioning of nuclear installations.

The basic instrument to meet policies and goals is the **maintenance and improvement of the Integrated Management System - IMS.**

All activities within the processes identified by IMS are managed so as to minimize negative impacts on the environment, health and safety of the population and employees and to be in line with the legal framework, authorisations and decisions issued by the relevant state supervisory bodies. The main principles of IMS include:

- Each employee is responsible for the quality of his/her work,
- All activities affecting quality shall be performed in accordance with the applicable regulations,
- IMS builds on good practice in the management system area, as well as on the best domestic and international experience,
- The management is responsible for elaboration, implementation, permanent monitoring, efficiency assessment and further development of IMS system including staff training,
- IMS is built as a unified management system, which includes all implemented activities and processes, significant in terms of achieving the organization's goals.

Building an Integrated Management System based on the Quality Management System - IMS

IMS is implemented:

- in accordance with the Slovak applicable legislation,
- IAEA Safety Standards/documents (“GSR Part 2 Leadership and Management for Safety”),
- international standards *STN EN ISO 9001:2016 Quality Management Systems. Requirements (ISO 9001: 2015)*, *STN was issued: 1 February 2016 – English version ISO 9001:2015 issued in 09/2015. Requirements*; *STN EN ISO 9004:2019 Quality Management. Quality of the organisation. Guidance to achieve sustained success (ISO 9004: 2018)*, *STN was issued: 1 September 2019 - English version ISO 9004:2018 was issued 04/2018. Guide to performance improvement*; *STN EN 9001:2016 Quality Management Systems. Requirements*; *STN EN ISO 14001:2016 Environmental Management Systems. Requirements with guidance for use*; *STN ISO 45001:2018 Occupational Health and Safety Management Systems. Requirements with guidance for use and ISO/IEC 27001:2013 for information security management system. Services Management. Part 1: Requirements for the Services Management System.* IMS of the licence holder is process oriented.

The effectiveness of the Integrated Management System is verified through:

- internal audits carried out within the framework of integrated management system for quality, environmental protection, occupational health and safety, nuclear safety, radiation protection and IT security – in a form of individual or combined internal audits under internal company regulations,
- audits by external certification companies that have certified IMS,
- the ÚJD SR inspections.

Findings revealed during audits, inspections and/or controls at the relevant levels are analysed by senior management. Based on the analyses, corrective actions are taken and their implementation is monitored.

Role of the Regulatory Bodies

The activities and roles of the ÚJD SR in state supervision over nuclear safety of nuclear installations in the field of quality assurance are given by the Act No. 541/2004 Coll. (Atomic Act), as well as ÚJD SR Decree No. 430/2011 and ÚJD SR Decree No. 431/2011.

Inspections by the Labour Inspectorate Nitra focus on Quality Assurance Systems consists in the control of legal entities and natural persons performing certain activities (production, installation, repairs, reconstruction, inspections, testing, revisions, maintenance, import of equipment, etc.) on equipment subject to labour inspection regime. The quality assurance system, documentation, documents, physical condition - technical equipment of legal entities and natural persons are also examined during the inspection of professional competence.

The verification of professional competence by the Labour Inspectorate shall in particular check:

- an extract from the Commercial Register,
- organisational support for the activity,
- staffing of the activity,
- material and technical support of the activity,
- other (according to the requirements of labour inspection authorities, e.g. certificates for activities of the staff, document on risk assessment of activities, designated safe working procedures, demonstrable familiarization and equipment for employees to ensure safety and protection of health at work, designated protective measures and protective equipment, internal regulations – rules on safety and protection of health at work, accompanying technical documentation of work equipment and technical equipment, keeping of documentation, records and record-keeping related to safety and protection of health at work).

F.4 Radiation Protection

Article 24 of the Joint Convention

Operational Radiation Protection

1. *Each Contracting Party shall take the appropriate steps to ensure that during the operating lifetime of a spent fuel or radioactive waste management facility*
 - i) *The radiation exposure of the workers and the public caused by the facility shall be kept as low as reasonably achievable, economic and social factors being taken into account;*
 - ii) *No individual shall be exposed, in normal situations, to radiation doses which exceed national prescriptions for dose limitation which have due regard to internationally endorsed standards on radiation protection; and*
 - iii) *Measures are taken to prevent unplanned and uncontrolled releases of radioactive materials into the environment.*
2. *Each Contracting Party shall take appropriate steps to ensure that discharges shall be limited*
3. *To keep exposure to radiation as low as reasonably achievable, economic and social factors being taken into account; and*

4. *So that no shall be exposed, in normal situations, to radiation doses which exceed national prescriptions for does limitation which have due regard to internationally endorsed standards on radiation protection.*
5. *Each Contracting Party shall take appropriate steps to ensure that during the operating lifetime of a regulated nuclear facility, in the event that an unplanned or uncontrolled release of radioactive materials into the environment occurs, appropriate corrective measures are implemented to control the release and mitigate its effects.*

F.4.1 Radiation Protection Legislation and its Implementation

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

The issue of radiation protection is regulated in Act No. 87/2018 Coll. on Radiation Protection. This Act transposes the requirements of Council Directive 2013/59/Euratom laying down basic safety standards for protection against the dangers arising from ionising radiation into Slovak legislation.

Act No. 87/2018 Coll. on Radiation Protection regulates the exercise of state administration in the field of radiation protection, the conditions for carrying out activities leading to radiation exposure and activities in the environment with natural sources of radiation, requirements for the management of radioactive substances, institutional radioactive waste and radioactive waste of unknown origin, the protection of workers and the public from exposure to radon in indoor air in buildings, external exposure from building materials and continuing exposure resulting from an emergency or from past human activities, ensuring the safety of the radioactive source, preparedness for radiation emergencies, monitoring of the radiation situation and the radiation monitoring network, limitation of exposure from drinking water, natural mineral water and spring water, obligations of natural persons and legal entities in ensuring radiation protection, offences, administrative offences and penalties in the field of radiation protection. The performance of activities and the provision of services relevant to radiation protection with regard to the level of potential radiation risk shall be divided into activities exempted from the scope of the Act, activities subject to notification, activities and services subject to registration, and activities and services performed under a licence.

The law also defines requirements for ensuring physical protection in the use of radioactive sources to prevent the misuse of radioactive sources for illegal manipulation, including the possibility of their misuse for terrorist purposes. Details of the requirements for ensuring radiation protection for the implementation of the Act are laid down in the implementing decrees of the MZ SR listed in the Annex VI.

F.4.2 Monitoring Radioactivity by the Licence Holder

Pursuant to Act No. 87/2018 Coll. on Radiation Protection, each holder of a registration and authorisation from the ÚVZ SR for the performance of activity leading to exposure or the provision of services important in terms of radiation protection, is obliged to ensure the monitoring of ionizing radiation and radionuclides that are produced or released as a result of activity leading to exposure in the working environment and in the environment around the workplace in accordance with the monitoring plan, and to inform workers of the results of monitoring.

The monitoring plan, according to the type of activity leading to exposure, include monitoring of the workplace in normal operation, in foreseeable deviations from normal operation, in radiological incidents or accidents; it is subdivided into sections governing monitoring of

- a) work areas of the workplace and areas adjacent to work areas,*
- b) the surroundings of a workplace,*
- c) personal,*
- d) discharge of radioactive materials from the workplace to the environment.*

Monitoring of a workplace is carried out based on a monitoring plan continuously, repeatedly or operationally for a specific activity leading to exposure to assess and ensure the acceptability of that activity in terms of radiation protection.

The monitoring plan shall take into account the nature of the workplace and the extent of the activity leading to exposure, performed at the workplace and shall contain the following:

- a) the quantities relevant for radiation protection to be monitored, the manner, extent and frequency of the measurements,*
- b) instructions for evaluating the results of the measurements and the method of record keeping,*
- c) the reference levels and the measures to be taken if they are exceeded,*
- d) the specification of measurement methods,*
- e) specification of the parameters of the types of measuring instruments and devices used.*

The monitoring plan shall enable radiation protection to be managed, exposure limits to be complied with and early detection of deviations from normal operation and demonstrate that radiation protection is optimised. The results of monitoring must be recorded by the licence holder so that they can be used if necessary, for estimating personal doses.

Personal monitoring ensures the detection of personal doses. For category A workers, personal monitoring must be carried out systematically. If, on the basis of monitoring or calculation, it is suspected that the exposure limits of workers may be exceeded, then the conditions and circumstances of exposure shall also be taken into account in the detection of personal doses. Personal monitoring may be undertaken by an authorised dosimetry service which holds a licence from the ÚVZ SR for services important in terms of radiation protection.

The personal dosimeter assigned to the worker shall be capable of measuring all types of radiation contributing to the worker's external exposure during the activities leading to the exposure. If the personal dosimeter does not allow such measurement, other personal dosimeters shall be used; this shall not apply if it is technically impossible to use a personal dosimeter. In such a case, dose estimation shall be provided by using the results of workplace monitoring or by calculating.

At workplaces with open radioactive sources, which can lead to internal exposure of workers, also the internal exposure must be evaluated. Intakes of radionuclides and effective dose is evaluated by measuring the activity of radionuclides in the body of a worker or his excreta, by measuring concentration of radionuclides in the air, measuring contamination of a workplace and converted to radionuclide intake using relevant factors and models of the respiratory and digestive tract.

The licence holder is required to regularly send reports on the results of monitoring to the ÚVZ SR according to the conditions set out in the licence and to provide them during inspections to the staff carrying out state supervision.

The licence holder is obliged, in accordance with applicable legislation, to regularly send the results of personal monitoring to the Central Register of Workers' Doses at the ÚVZ SR no later than 30 days after receipt of the results of personal dosimetry by an authorised dosimetry service and, in the case of workers working abroad, is obliged to report the results of workers' personal doses no later than 3 months after returning from work abroad. Exceeding the exposure limits shall be notified by the licence holder as soon as they are detected. The licence holder shall keep the results of personal dosimetry up to 75 years of age of the workers or at least 30 years after the end of the work with radiation sources and submit them to the inspectors during inspections.

F.4.3 Gaseous and Liquid Discharges

The release from administrative control of radioactive substances and radioactively contaminated objects produced or used in the course of an activity leading to radiation exposure in a nuclear installation shall be subject to the authorisation by ÚVZ SR pursuant to Act No. 87/2018 Coll. on radiation protection.

Discharge of radioactive substances into the environment means a controlled continuous discharge or campaign discharge of radioactive substances into the air, surface water or public sewers which is systematically monitored.

The discharge of liquid and gaseous effluents from nuclear installations is governed by three types of legislation:

- *Act No. 87/2018 Coll. on radiation protection and its implementing regulations,*
- *Indirectly also by the Atomic Act – within the limits and conditions for safe operation or decommissioning,*
- *liquid discharges are affected by the Government Regulation No. 296/2005 Coll., which specify the values of permissible pollution of surface waters.*

Reference annual discharge levels are listed in Annex II.

Pursuant to Act No. 87/2018 Coll. on radiation protection, the licence holder is obliged to submit for approval to the state regulator the principles for the discharge of radioactive materials into the environment in the radiation protection programme *which is commensurate to the activity leading to exposure, includes the following, e.g.:*

- a) *specification of ionizing radiation sources, accessories, parameters*
- b) *specification of the sources of ionizing radiation to be manufactured*
- c) *a description and parameters of the workplace, supplemented by information on shielding and protective equipment, means and devices, workstation equipment and characteristics of the workplace environment*

- d) *the structure, scope and competences of the radiation protection unit or the assignment of responsibility for protection and safety at the different management levels (staff and persons in management positions), including the corresponding organisational arrangements and responsibilities (e.g. in the case of outsourced staff), the allocation of the respective responsibilities between the employer, the registration holder and the professional representative*
- e) *the assignment of responsibility for the sources of ionizing radiation used*
- f) *a proposal for the demarcation of protection zones, the regime in the protection zones and the system of control of objects, materials and equipment removed from the RCA*
- g) *a list of operating procedures relevant to radiation protection, etc.*

Act No. 87/2018 Coll. on radiation protection in Section 91 states:

Radioactive materials may be discharged into the air and surface waters from the workplace, where the activity leading to exposure is performed, if the discharge was permitted by ÚVZ SR or the relevant regional authority, and if it is ensured that the average effective dose of a representative person caused by the release into the environment in any calendar year does not exceed 0.05 mSv, even if the released radioactive material accumulates as a result of the activity.

With regard to the discharge of radioactive materials from a nuclear installation into the environment, the dose limit of a representative person for the design, construction and operation of a nuclear installation for one operator of a nuclear installation is 0.25 mSv per calendar year. In the case of discharges into the air and surface waters, the value of the limit dose of a representative person shall be determined separately for individual discharges as follows:

- a) an effective dose of 0.2 mSv pre calendar year for releases into the air, and
- b) an effective dose of 0.05 mSv per calendar year for discharges into surface waters.

If there are several nuclear installations on one site or region (that affect the dose of a representative person), this value applies to the total exposure from all nuclear installations in the locality or the region. It is possible to discharge radioactive material into the environment from a workplace, where activity leading to exposure is performed, without the permission from the ÚVZ SR or the relevant regional authority, if in any calendar year the average effective dose caused by their *release* into the environment does not exceed 0.01 mSv in a representative person, and at the same time the collective effective dose shall not exceed 1 manSv; the conditions for meeting the criteria under this paragraph are set out in Annex 5 of Act No. 87/2018 Coll. on radiation protection.

The ÚVZ SR may require the applicant for an authorisation for the release of radioactive materials from the workplace to prepare an optimization study.

This means that the dose limit is the basic criterion for checking the current *annual reference levels* of discharged activities of radioactive materials listed in Annex II. (checking that the above-criterion is not exceeded – not exceeding the effective dose – was performed by a software through the appropriate geographical model and conversion factors).

Measurements performed with the purpose to balance or evaluate dose load of population are conducted with the help of designated measurement devices, which are verified by bodies of state metrology pursuant to metrological regulations.

Discharges of radioactive materials into the air are continuously monitored in the ventilation stacks of nuclear installations in order to check that the daily *reference levels* are not exceeded. At the same time, samples are taken in samplers to determine radionuclide composition and balance. Requirements for balancing of individual radionuclides are defined in the relevant decisions of ÚVZ SR for individual nuclear installations.

The basic balance annual reference levels of discharges of radioactive materials are supplemented by reference levels, the aim of which is to continuously monitor the operational status of the nuclear installation:

- Investigation levels, exceeding of which initiates investigation of the current status,
- Intervention levels, exceeding of which activates the action to reduce the relevant discharge.

JAVYS, a. s., discharges gaseous radioactive discharges from four stacks (the main production unit of NPP A1 + bituminisation lines, BSC, Interim Spent Fuel Storage facility, NPP V1). Of these, until 21 October 2011, only NPP V1 and ISFS stacks have their own *reference levels* for gaseous discharges and the others were intended for “ventilation stacks in the NPP A1 site”. ÚVZ SR issued its decision No. ÚVZSR/ORO/9195B/28714/2023 of 9 January 2024, which assesses TSÚ RAO and NPP A1 (ventilation stacks in the NPP A1 site) – consisting of a bituminisation line, BSC, the main production unit of NPP A1, not as a whole, but as 3 standalone facilities with discharge points to the atmosphere: VK 46 part A, VK 46 part B and VK 808. the ISFS facility is further assessed separately as VK 840.

- VK 46A – buildings: 28, 30, 32, 34
- VK 46B – buildings: 809 and 41
- VK 808 – buildings : 808, 44/10, 44/20 and ZFK
- VK 840 – building: 840

Investigation level for the mixture of radionuclides beta and gamma in aerosols discharged through ventilation stacks within the premises of TSÚ RAO and NPP A1 valid from 2006: **10 Bq/m³**.

ISFS	Aerosols beta / gamma	
	Discharge [MBq]	% Of annual reference level
Year		
1994	33,62	11,20
1995	23,90	7,97
1996	12,92	4,31
1997	20,38	6,79
1998	23,95	7,98
1999	27,12	9,04
2000	25,31	8,44
2001	12,48	4,16
2002	50,42	16,81
2003	0,65	0,22

2004	1,50	0,50
2005	3,06	1,02
2006	0,87	0,29
2007	1,26	0,42
2008	0,55	0,18
2009	0,53	0,18
2010	0,41	0,14
2011	0,36	0,12
2012	0,50	0,17
2013	0,67	0,09
2014	0,11	0,04
2015	0,11	0,04
2016	0,11	0,04
2017	0,08	0,03
2018	0,09	0,03
2019	0,09	0,03
2020	0,18	0,06
2021	0,17	0,06
2022	0,17	0,06
2023	0,16	0,05

VK 840	Mixture of radionuclides (alpha/beta/gamma)	
Year	Discharge [kBq]	% Of annual reference level
2012	504,238	0,17
2013	272,383	0,09
2014	156,686	0,05
2015	177,288	0,06
2016	140,814	0,05
2017	92,559	0,03
2018	100,400	0,03
2019	98,897	0,03
2020	185,712	0,06
2021	180,903	0,06
2022	181,151	0,06
2023	165,649	0,06

Table 6 Gaseous discharges until 2023 identified as ISFS and from 2012 as VK 840

Gaseous discharges from the ISFS are shown in Table 6.

Liquid discharges from ISFS are accumulated, measured and released together with liquid discharges from NPP V1.

Liquid discharges are monitored at the source – tank ready for discharging. This means that the values for total volume activity and eventually for volume activity of tritium of samples taken from ponds of particular technological units are measured before they are released. Based on the result of the analysis and comparison with *values of the reference levels*, the water from the tanks is either returned to the technological processes or for purification to the water treatment station or discharged through the waste water control station to the environment (the Váh river).

Liquid discharges from the National RAW Repository are only drainage and runoff (rainwater) water, which falls on the roof of buildings and then collected in retention tanks. After filling and analysis of radionuclides (the list of radionuclides and their reference values are given in the Table of Annex II.) it is discharged into the Telinsky stream.

Values of discharges of radioactive substances into the atmosphere and hydrosphere from NPP A1 and technology for treatment and conditioning of RAW for the period 1994 – 2013 are shown in the following Tables (Table 6 and Tables 7, 8, 9, 10 resp. Table 11). It can be concluded that the annual reference levels for discharges of radioactive effluents were not exceeded throughout the period under review, while discharges of corrosion and fission products and discharges to the atmosphere were well below the authorised annual reference levels.

According to the ÚVZ SR decision (department of health protection against radiation) OOPŽ/7119/2011, since 2012, TSÚ RAO and NPP A1 are evaluated separately as 3 standalone discharge points VK 46/A, VK 46/B and VK 808.

VK 46/B	Radionuclides (beta/gamma)		Strontium(⁹⁰ Sr-beta)		Trans Uranium (alpha/gamma)	
	Year	Discharge [kBq]	% of annual reference level	Discharge [kBq]	% of annual reference level	Discharge [kBq]
2012	149,706	0,106	10,973	0,261	0,854	0,065
2013	216,576	0,154	5,153	0,123	1,556	0,118
2014	32,064	0,023	7,223	0,172	0,685	0,052
2015	23,901	0,017	6,358	0,151	0,301	0,023
2016	36,092	0,026	6,778	0,161	0,368	0,028
2017	169,110	0,120	9,240	0,220	0,380	0,029
2018	62,807	0,045	7,079	0,169	0,338	0,026
2019	75,103	0,053	6,001	0,143	0,452	0,034
2020	84,296	0,060	6,990	0,166	3,025	0,229
2021	26,338	0,048	7,746	0,184	0,749	0,057
2022	4 687,911	3,325	155,086	3,693	38,871	2,945
2023	2,962,446	2,101	383,874	9,140	54,489	4,128

Table 7 Gaseous discharges from VK 46/B

VK 808	Radionuclides (beta/gamma)		Strontium(⁹⁰ Sr-beta)		Trans uranium (alpha/gamma)	
	Year	Discharge [kBq]	% of annual reference level	Discharge [kBq]	% of annual reference level	Discharge [kBq]
2012	514,548	0,365	37 731	0,898	1,007	0,076
2013	254,618	0,181	11,736	0,279	0,335	0,025
2014	120,806	0,086	7,743	0,184	0,454	0,034
2015	297,447	0,211	7,442	0,177	0,362	0,027
2016	91,207	0,065	8,176	0,195	0,364	0,028
2017	54,993	0,039	11,400	0,271	0,283	0,021
2018	157,965	0,112	8,524	0,203	0,352	0,027

2019	121,945	0,086	6,502	0,155	0,328	0,025
2020	157,313	0,112	7,535	0,179	0,376	0,028
2021	253,270	0,180	7,819	0,186	0,362	0,027
2022	97,029	0,069	10,337	0,246	0,439	0,033
2023	233,046	0,165	5,259	0,125	0,663	0,050

Table 8 Gaseous discharges from VK 808

VK 46/A	Radionuclides (beta/gamma)		Strontium(⁹⁰ Sr-beta)		Trans Uranium (alpha/gamma)		
	Year	Discharge [kBq]	% of annual reference level	Discharge [kBq]	% of annual reference level	Discharge [kBq]	% of annual reference level
	2012	1 850,373	0,281	78,826	0,402	19,184	0,311
	2013	1 272,809	0,193	27,533	0,140	6,084	0,099
	2014	565,089	0,086	13,329	0,068	5,811	0,094
	2015	424,747	0,065	16,367	0,084	4,056	0,066
	2016	311,043	0,047	13,537	0,069	4,095	0,066
	2017	2 175,581	0,331	27,610	0,141	7,803	0,127
	2018	3 406,446	0,518	97,170	0,496	24,681	0,401
	2019	4 125,023	0,627	105,700	0,539	58,927	0,957
	2020	1 358,548	0,206	88,418	0,451	36,485	0,592
	2021	2 642,082	0,402	821,884	4,193	202,586	3,289
	2022	34 887,896	5,302	3 503,087	17,873	935,145	15,181
	2023	32 625,236	4,958	4 914,632	25,075	1 369,067	22,225

Table 9 Gaseous discharges from VK 46/A

Discharges to the Váh river from TSÚ RAO and NPP A1 consist of two types of waters:

- Service water – originating from operations of TSÚ RAO and NPP A1
- Remediation pumping of groundwater – originating from the N-3 drill, building 106

Váh River	Tritium		Corrosion and fission products		
	Year	Discharge [GBq]	% of annual reference level	Discharge [MBq]	% of annual reference level
	1994	840	1,92	24,47	0,064
	1995	1958,48	3,1	50,631	0,13
	1996	505,08	1,16	33,8	0,09
	1997	11850	27,12	29,665	0,08
	1998	249,87	0,57178	130,7	0,34395
	1999	1120	2,56293	169,3	0,44553
	2000	740,8	1,69519	87,68	0,23074
	2001	3023	6,91762	67,874	0,17862
	2002	589,009	1,34785	90,566	0,23833
	2003	2258,26	5,16763	86,867	0,2286
	2004	2411,095	5,5174	85,296	0,22446
	2005	2141,8	4,90114	70,511	0,18556
	2006	1000,4	8,93	76,01	0,48
	2007	237,827	2,59	89,21	0,74
	2008	212,30	2,12	135,10	1,13
	2009	186,64	1,87	114,85	0,96

2010	225,72	2,26	116,81	0,97
2011	346,423	3,464	60,074	0,501
2012	228,934	2,289	23,042	0,192
2013	110,654	1,107	10,126	0,084
2014	156,686	1,567	6,964	0,058
2015	177,288	1,773	12,528	0,104
2016	140,814	1,408	8,427	0,070
2017	117,822	1,178	15,835	0,132
2018	460,381	4,604	17,791	0,148
2019	92,823	0,928	15,433	0,129
2020	119,066	1,119	17,748	0,148
2021	106,192	1,062	13,770	0,115
2022	314,538	3,145	10,365	0,086
2023	55,241	0,552	23,166	0,193

Dudvák River	Tritium (³ H)		Corrosion and fission products (alpha/beta/gamma)	
	Discharge	% of annual reference level	Discharge [MBq]	% of annual reference level
1994	211,2	48,33	36	9,5
1995	0,213	0,05	3,905	1,03
1996	0,13	0,03	1,69	0,44
1997	0,048	0,01	0,495	0,13
1998	0,004	0,00092	1,016	0,27
1999	0,002	0,00048	0,532	0,14
2000	0,00027	0,000063	0,223	0,06
2001	0,00021	0,000047	0,046	0,01211
2002	0,0014	0,00032	0,463	0,12184
2003	0,0005	0,00011	0,013	0,00342
2004	0	0	0	0
2005	0	0	0	0
2006	0	0	0	0
2007	20,38	55,08	13,17	10,98
2008	0	0	0	0
2009	0	0	0	0
2010	0	0	0	0
2011	0,002	0,005	0,357	0,297
2012	0,001	0,002	0,162	0,135
2013	0	0	0	0
2014	0	0	0	0
2015	0	0	0	0
2016	0	0	0	0
2017	0	0	0	0
2018	0	0	0	0
2019	0	0	0	0
2020	0	0	0	0
2021	0	0	0	0
2022	0	0	0	0
2023	0	0	0	0

Table 10 Liquid discharges from NPP A1 and the conditioning technology of TSÚ RAO

Gaseous and liquid discharges from RAW and SNF management facilities make up a minor part of the total discharges. In all years of operation, the following limit values resulting from the relevant decisions of the ÚVZ SR have not been exceeded.

No such activity has been identified in liquid discharges from the RU RAO that exceeds normal levels in storm water and surface water during the entire period of operation. An assessment of the annual liquid discharges for the years 2004 - 2019 is presented in Table 12.

Year	Volume of discharged water – m ³	Annual discharged activity kBq (fulfilment of L&Cs -%)			
		³ H	¹³⁷ Cs	⁶⁰ Co	⁹⁰ Sr
2004	4140	3870 (0,02)	301 (1,31)	275 (1,22)	186 (0,07)
2005	6774	6430 (0,03)	142 (0,62)	135 (0,60)	149 (0,06)
2006	5821	5610 (0,03)	931(0,41)	105 (0,47)	64 (0,03)
2007	3272	3300 (0,02)	589 (0,26)	7,85 (0,03)	7,8 (0,003)
2008	6098	6120 (0,03)	128 (0,56)	189 (0,84)	792 (0,32)
2009	969	8687 (0,046)	111 (0,48)	154 (0,69)	179 (0,07)
2010	11126	20845 (0,111)	357 (1,566)	399 (1,781)	684 (0,28)
2011	4 458	5 994 (0,032)	152 (0,66)	180 (0,804)	341 (0,139)
2012	3 405	12 482 (0,066)	1 019 (4,47)	798 (3,56)	130 (0,053)
2013	7 491	18 744 (0,099)	1 403 (6,15)	815 (3,64)	570 (0,23)
2014	6 129	15 336 (0,082)	108 (0,47)	100 (0,446)	406 (0,17)
2015	2 450	6 130 (0,033)	64 (0,281)	57 (0,254)	621 (0,26)
2016	2 724	6 816 (0,036)	58 (0,254)	33 (0,147)	57 (0,233)
2017	1 816	4 544 (0,024)	36 (0,158)	19 (0,085)	339 (0,139)
2018	1 927	4 820 (0,026)	41 (0,180)	25 (0,112)	409 (0,168)
2019	2 270	5 680 (0,030)	66 (0,289)	64 (0,286)	425 (0,174)
2020	2 724	6 816 (0,036)	48 (0,211)	24 (0,107)	281 (0,115)
2021	2 270	5 680 (0,030)	40 (0,175)	20 (0,089)	225 (0,092)
2022	2 270	5 680 (0,030)	40 (0,175)	20 (0,089)	235 (0,096)
2023	2 724	6 816 (0,036)	48 (0,211)	24 (0,107)	32 (0,013)

Table 11 Yearly liquid discharges – water from the runoff RÚ RAO

F.4.4 Exposure Limits for Workers

Exposure limits for workers are set by Act No 87/2018 Coll. on Radiation Protection for a yearly period, while the own *dose limits and reference levels* set, at which the cause of their exceedance is evaluated and their justification is justified, are lower than the values set by the legislation.

All work shall take into account the basic principles of radiation protection, the principle of justification of activities, the principle of optimisation of radiation protection and the principle of dose limitation.

A graphical representation of the average collective effective dose of NPP A1 and the RAO treatment and conditioning technology for the years 2010 to 2022 is shown in Fig. 23.

The collective dose equivalent is consistently at a low average level, indicating a very good level of its management by the application of the ALARA system, optimising the planned individual and collective doses. During the period, no employee of JAVYS, a. s. (NPP A1, TSU RAO) or *outsourced workers*

exceeded the exposure limits or the ALARA target indicators.

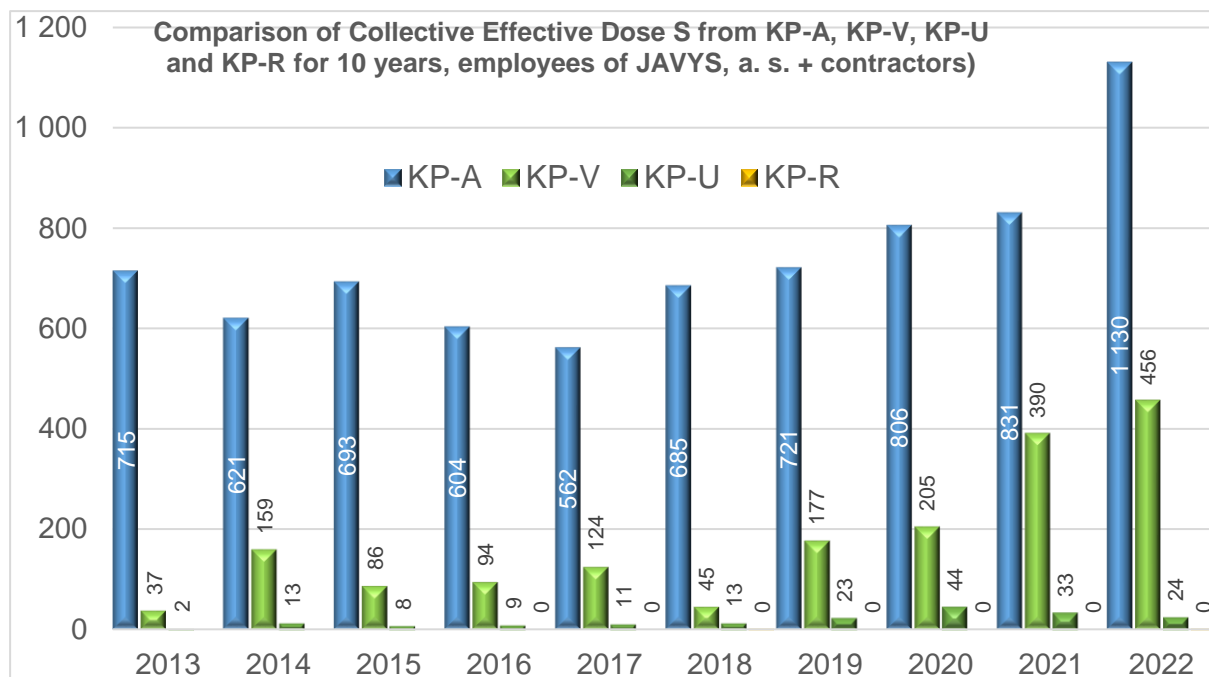


Fig. 25 Collective effective dose NPP A1 and TSÚ RAO, ISFS NPP V1 and RÚ RAO and FS KRAO

F.4.5 Monitoring of radiological values

Impact of nuclear installations at the Jaslovské Bohunice site is evaluated in two ways:

- By monitoring of radiation values directly in the environment and by laboratory evaluation of environmental samples. Yearly there are about 2,000 environmental samples being evaluated from the surroundings of the nuclear installations at Jaslovské Bohunice site, which are evaluated at the Laboratory of Radiation Control of the surroundings of SE-EBO. The following values are monitored:
 - the volume activity of aerosols in continuous abstractions of air;
 - surface activity of atmospheric fallout,
 - volume activity of milk;
 - volume activity of drinking surface waters;
 - volume activity of ground waters;
 - mass activity of agricultural products (clover, barley, wheat, ...),
 - mass activity/area activity of soil,
 - continuous measurement of power input spatial dose equivalent and gamma spectrometric measurement in the field.
- Using analytical method – yearly values of discharged radioactive materials are entered as input values for the calculation program. The program, to which more data are entered (continuous annual meteorological situation, demographical statistical data, conversion factors defined by the relevant international institutions), is designed to calculate the impact of a nuclear installation on the surroundings. The Program is approved by the state regulator in *radiation protection* – ÚVZ SR.

Results of measurements and calculations are published in information reports on a quarterly and annual basis in a printed form and are submitted to the bodies of state regulation and bodies of public administration. The same applies also for the area of NI at Mochovce – RÚ RAO. **Based on the conclusions from the above mentioned Annual Reports for 2008 – 2023 the radiological impact of the NI to its surroundings is negligible.**

The annual individual dose equivalent (hereinafter referred to as “IED”) for three most loaded groups of population calculated from the monitoring data are shown in the Table 13. These IEDs are significantly lower than IEDs that residents receive from the natural radiation background. The individual dose equivalent from the natural radiation background in the vicinity of NPP Jaslovské Bohunice and NPP Mochovce is 100 – 10,000 times higher than the IED values given in the Table. At the same time, IED calculations are characterized by considerable conservatism.



Fig. 26 Monitoring equipment at the National Repository of RAW

Year	IDE [Sv]		
	Infants	7-12 yr	Adults
1998	1,64 E-7	1,11 E-7	6,61 E-8
1999	6,63 E-8	8,67 E-8	8,29 E-8
2000	1,49 E-7	2,05 E-7	1,92 E-7
2001	1,79 E-7	2,31E-7	2,28 E-7
2002	1,96 E-7	2,25 E-7	2,21 E-7
2003	7,59 E-8	9.33 E-8	8.96 E-8
2004	1,32 E-7	1,49 E-7	1,46 E-7
2005	1,18 E-7	1,6 E-7	1,51 E-7
2006	1,09 E-7	1,44 E-7	1,37 E-7
2007	1,91 E-7	2,24 E-7	2,19 E-7
2008	1,37 E-7	2,16 E-7	2,12 E-7
2009	1,20 E-7	2,07 E-7	2,02 E-7

2010	7,97 E-8	1,56 E-7	1,51 E-7
2011	1,39E-7	1,98Ee-7	1,98E-7
2012	1,32E-7	2,09E-7	2,09E-7
2013	1,24E-7	2,06E-7	2,10E-7
2014	1,25 E-7	2,07 E-7	2,12 E-7
2015	1,23 E-7	1,95 E-7	1,98 E-7
2016	9,97 E-8	1,56 E-7	1,58 E-7
2017	2,09 E-7	3,34 E-7	3,22 E-7

Year	IDE [Sv]			
	Foetus	0-5 yrs	6-15 yrs	Adults
2018	4,91 E-8	1,56 E-7	1,9 E-7	1,95 E-7
2019	4,53 E-8	1,32 E-7	1,56 E-7	1,58 E-7
2020	6,64 E-8	1,98 E-7	2,35 E-7	2,35 E-7
2021	7,13 E-8	2,39E-7	2,86 E-7	2,91 E-7
2022	6,24 E-8	1,89 E-7	2,26 E-7	2,28 E-7
2023	5,35 E-8	1,45 E-7	1,73 E-7	1,75 E-7

Table 12 Calculated annual IED for the groups of population in the vicinity of NPP *Jaslovské Bohunice*. Since 2018, the age structure of the population has been adapted to the new legislation

F.5 Emergency Preparedness

Article 25 of the Joint Convention

Emergency Preparedness

1. *Each Contracting Party shall ensure that before and during operation of a spent fuel or radioactive waste management facility there are appropriate on-site and, if necessary, off-site emergency plans. Such emergency plans should be tested at an appropriate frequency.*
2. *Each Contracting Party shall take the appropriate steps for the preparation and testing of emergency plans for its territory insofar as it is likely to be affected in the event of radiological emergency at a spent fuel or radioactive waste management facility in the vicinity of its territory.*

F.5.1 Emergency Preparedness Legislation

In the legislation of SR the emergency preparedness, planning and emergency plans are governed by several pieces of legislation listed in Annex VI.

Basic legislation also includes other laws in the field of crisis management and partially emergency planning.

- Constitutional Act No. 227/2002 Coll. on State Security at Wartime, State of War, State of Crisis and State of Emergency, which concerns, inter alia, management of situations relating to terrorist and violent criminal acts;
- Act No. 42/1944 Coll. on Civil Protection of the Population;

- Act No. 387/2002 Coll. on Governance of State in Crisis Situations Outside the Time of War and State of War;
- Act No. 129/2002 Coll. on Integrated Rescue System;
- Act No. 128/2015 Coll. on the Prevention of Major Industrial Accidents and on amendments to certain laws as amended by Act No. 91/2016 Coll.
- Act No. 45/2011 Coll. on Critical Infrastructure;
- Act No. 179/2011 Coll. on Economic Mobilization and on amendments to Act No. 387/2002 Coll. on Managing the State in Crisis Situations beyond the Time of War and the State of War.

F.5.2 Implementation of Emergency Preparedness Legislation

F.5.2.1 National Organisation of Emergency Preparedness

Act No. 387/2002 Coll. on Governance of State in Crisis Situations Outside the Time of War and State of War establishes the competence of public authorities in the management of the state in crisis situations outside times of war and state of war, the rights and obligations of legal entities and natural persons in preparing for and dealing with crisis situations outside times of war and state of war, and sanctions for violation of the obligations set out in this Act.

The bodies of crisis management are: Government of the Slovak Republic; Security Council of the Slovak Republic; the ministries and other central state authorities; National Bank of Slovakia; Security Council of the Region, District Office; Security Council of the District; Municipality.

In accordance with Act No. 387/2002 Coll. on the Management of the State in Crisis Situations Outside Times of War and State of War, the Government of the Slovak Republic, as the supreme crisis management authority, establishes the Central Crisis Staff as its executive body, which coordinates the activities of state administration bodies, local government bodies and other units designated to deal with a crisis situation in times of crisis, i.e. when dealing with an incident or accident at a nuclear facility or when transporting nuclear material.

The chairman of the Central Crisis Staff is the Minister of Interior of SR.

In order to ensure the necessary measures to cope with a nuclear emergency and measures to protect the population and the economy in the event of an accident with an impact on the surrounding area, the national emergency response organisation is divided into three levels:

The first level is formed by Emergency Response Organizations of nuclear installations, whose main functions are: management of works and measures on the territory of nuclear installations so as to enable establishing the state of the technological equipment and to manage actions to deal with the emergency and limit the consequences for personnel, equipment, the environment and the public.

Another function of this level is the information function for the activities of public administration authorities at the level of local government, the relevant public administration authorities at the national level, to provide information the o state of facilities and possible impacts on the surroundings.

The second level is organized at the regional level and is made up of crisis staff of the local government and self-government, whose territory falls into the emergency planning zone, where life, environment, health or property may be threatened, and where measures to protect the population are planned. The emergency planning zone for nuclear facilities for storage and management of spent nuclear fuel and radioactive materials is defined by the ÚJD SR Decisions:

- *the size of the emergency planning zone for the RÚ RAO by the ÚJD SR Decision No. 159/2024,*
- *the size of the common emergency planning zone for NPP A1, IS RAO, TSÚ RAO, NPP V1 and ISFS by the ÚJD SR Decision No. 187/2024,*
- *the size of the emergency planning zone of FS KRAO by the ÚJD SR Decision No. 160/2024,*

All areas of the emergency planning zones were defined as an area delineated by the guarded area barrier of NI.

The third (national) level is formed by the Central Crisis Staff of the Government (CCS). The CCS cooperates with its specialised support units (such as: Emergency Response Centre of ÚJD SR – ERC, the Centre of Radiation Monitoring Network of SR at ÚVZ SR, Central Monitoring and Control Centre of the MV SR and other). The role of the CCS is to deal with an emergency situation if the scale of the emergency extends beyond the territory of the county. Part of this level are emergency staffs of nuclear operators, which closely cooperate with the Emergency Response Centre of the ÚJD SR, as well as with local government and self-government.

Emergency commissions of licence holders inform the ERC of the ÚJD SR and state and municipal authorities about their activities, send radiation, meteorological and technological data to the ERC according to the requirements of the ÚJD SR. The main task of the emergency commission is primarily to organise and coordinate the rapid elimination of the consequences of serious and extraordinary events at the nuclear installations concerned.

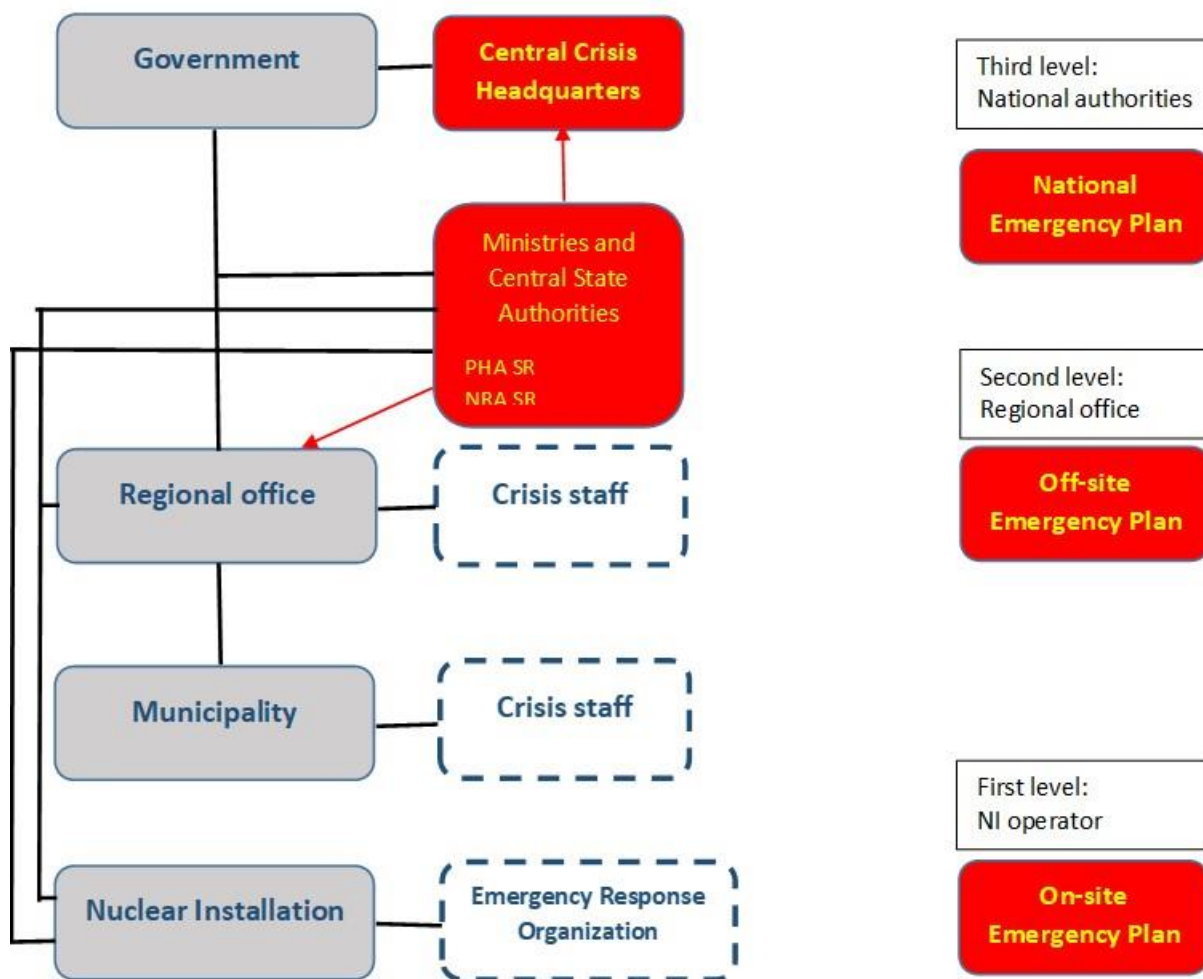


Fig. 27 Scheme of vertical division of the national response organization to an emergency following a radiation accident

Pursuant to Annex 14 to Act No. 87/2018 Coll. *on radiation protection*, the emergency response shall be implemented through timely implementation of measures that include, inter alia:

- Introduction of protective measures of the population,
- Assessment of the effectiveness strategies and measures put in place and their adaptation to the specific situation,
- Comparison of benefits with the applicable reference level, focusing on groups of the population, whose doses exceed the reference level,
- Implementation of further protection strategies based on specific conditions and available information, if necessary.

Pursuant to *Section 144 (1)* of Act No. 87/2018 Coll. *on radiation protection*, 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, limit leakage of radionuclides or stop leakage of radionuclides or ionizing radiation; in relation to the environment, in order to reduce the transfer of radioactive materials to a person from the public and thus to reduce his exposure caused by radioactive

materials by important routes of exposure and in relation to a person from the public to reduce his exposure, and if necessary, to also provide for his/her treatment.

In an emergency, which is an accident pursuant to Act No. 541/2004 Coll. (Atomic Act), *the ÚJD SR Emergency Staff working under ERC ÚJD SR, evaluates the course and consequences of incidents or accidents at nuclear installations and during transports of radioactive materials, and also submits to the competent crisis management authorities proposals for the implementation of protective measures pursuant to Section 144 par. 3 of Act No. 87/2018 Coll. on radiation protection. Representative of ÚVZ SR is also a member of ÚJD SR Emergency Staff.*

In an emergency, which is an extraordinary situation according to Section 3(b) of NR SR Act No. 42/1994 Coll. on Civil Protection of the Public, ÚVZ SR submits to the competent authorities in the field of civil protection of the public (Sections 12 to 15 of NR SR Act No. 42/1994 Coll. on civil protection of the public) proposals for the implementation of protective measures pursuant to Section 144 (3) of Act No. 87/2018 Coll. on radiation protection.

In an emergency, which is not an extraordinary situation according to Section 3(b) of NR SR Act No. 42/1994 Coll. on Civil Protection of the Public, the competent radiation protection authority shall order appropriate protective measures. When deciding on the adoption of protective measures, the competent authority shall follow the general criteria for the adoption of protective measures set out in Annex 12 to the Act No. 87/2018 Coll. on radiation protection.

Facts indicating the suspected occurrence or indicating the occurrence of a radiological emergency outside the site of a nuclear installation or a workplace with sources of ionising radiation are:

- a) values of radiation monitoring measurements on the territory of the Slovak Republic which are higher than the intervention level values defined in the monitoring plan or the intervention level values defined in the discharge monitoring programme or in the monitoring programme for the workplace surroundings,
- b) notification on a radiological emergency outside the territory of the Slovak Republic communicated to the EC, IAEA or neighbouring states.

In order to limit emergency exposure under emergency situation, in addition to the general criteria for the adoption of protective measures according to *Annex 12 to Act No. 87/2018 Coll. on radiation protection*, the values of directly measurable quantities have been set (hereinafter only as “Operational Intervention Levels”) pursuant to Annex 4 to the MZ SR Decree No. 99/2018 on provision of radiation protection, when exceeding these, protective measures need to be considered (Sections 15 and 16 of the ÚJD SR Decree No. 55/2006 on the details in emergency planning in case of an incident or accident (ÚJD SR Decree No. 55/2006“)).

Operational Intervention Levels (OILs) are values of directly measurable quantities, these are pre-calculated values that correspond to the relevant general criterion for the implementation of protective measure. They reflect the parameter of a specific source of ionizing radiation, the nature of the event and the weather condition.

If specific field measurement results are to be the decisive criterion for the implementation or correction

of urgent protective measures, appropriately verified and regularly calibrated meters must be used for measurements, and suitable pre-defined measurement conditions, evaluation of measured data and measurement uncertainty must not be neglected.

Operational Intervention Levels, which are part of Annex 4 of the MZ SR Decree No. 99/2018 on provision of radiation protection, were transposed into the Slovak legislation 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.

F.5.2.2 Professional and technical resources of the national emergency preparedness organisation

1. Central Monitoring and Control Centre (hereinafter referred to as "CMRS")
2. Emergency Response Centre of ÚJD SR is a technical support tool of ÚJD SR for monitoring the operation of NIs and for evaluating the technical condition and radiation situation in the event of a nuclear or radiation accident and forecasting the development of the accident and its consequences in accordance with the Atomic Act. At the same time, it serves as a technical support tool for Central Emergency Staff.
3. Radiation Monitoring Network Headquarters (hereinafter referred to as "ÚRMS"), whose function is fulfilled by a group of ÚVZ SR staff, is a technical support body that provides an effective monitoring system combining the monitoring systems of individual ministries. Central Emergency Staff may invite ÚRMS representatives in case of a crisis situation.

Central Monitoring and Control Centre (CMRS)

A Central Monitoring and Control Centre (CMRS) was established to monitor, manage, evaluate and support the activities of continuous operational management of the state administration within the competence of the Ministry of the Interior of the SR in the field of the Integrated Rescue System, civil protection and crisis management, as well as tasks and measures related to the coordination of the activities of the crisis management authorities in preparing for and dealing with a crisis situation. CMRS MV SR consists of spatial, personnel, documentation and technological support for information, communication and other technologies.

CMRS provides a continuous 24-hour permanent service for the purpose of fulfilling the function of supervising the activities of the coordination centers of the integrated rescue system, the explanatory and warning center of the Slovak Republic, the national control and coordination center for the provision and reception of international humanitarian aid, the national contact point for receiving and transmitting warning messages, information messages and messages requesting assistance from the Emergency Response Coordination Center (ERCC), national contact points of neighbouring and contracting states, international organizations and crisis management authorities of the Slovak Republic, the United Nations - Office for the Coordination of Humanitarian Affairs in Geneva (UN OCHA), the United Nations - Economic Commission for Europe (UN-ECE), the Euro-Atlantic NATO Disaster Relief Coordination Center (EADRCC), the EU Emergency Response Coordination Center (ERCC), the European Atomic

Energy Community (Euratom) and of the relevant state authorities of the Slovak Republic.

General tasks for the CMRS include:

- To collect information on the extent and nature of the crisis phenomenon. This includes information about the event, emergency, information about the status of forces and resources,
- To consolidate information from various sources into a comprehensive operational picture to support the decision-making at the highest level,
- *To collect, process and evaluate information about extraordinary events necessary for the implementation of management and executive measures of civil protection and crisis management to deal with extraordinary events in the Slovak Republic with links to international bodies and organizations (ministries and other central state administration bodies, state bodies, public law institutions, local state administration, municipality),*
- To provide an instrument for cooperation with neighbouring countries, with regional / coalition partners in those cases when the crisis transcends the national boundaries,
- To provide mechanism for communication and dissemination of information.

Emergency Response Centre (ERC)

In accordance with the legislation in force, the ÚJD SR has established the Emergency Response Centre (ERC) as a means to assess the course and consequences of incidents and accidents in the NIs of major importance in terms of their potential impact on the environment, to prepare proposals for measures or recommendations for further action. ERC is included in the emergency preparedness system and prepares recommendations for protective measures at an early stage. It is also responsible for the tasks of a liaison point under international conventions and EU requirements and for receiving and forwarding requests for assistance to the International Atomic Energy Agency. The ÚKŠ/CCS may call on specialists from different ministries to deal with the incident. The relationship between the different entities in the management of actions to protect the public in the event of an incident or accident with impacts of radioactive substances on the environment is shown in Fig. 25.

For the work in ERC, the ÚJD SR created an emergency staff from specialists and other staff of the Authority. The main functions of the Emergency Staff are:

- To analyse the status of nuclear installation in case of an event;
- To develop projections for development of event – incident or accident and radiological impacts on the general public and on the environment;
- To propose recommendations for measures to protect the general public and to refer them to the CCS, the relevant district offices at the seat of the region;
- To prepare supporting documentation and recommendations for the Chairperson of the Office, who is a member of CCS;
- To supervise the activities of the NI operator during an emergency,
- to inform the EC, the IAEA and the neighbouring countries according to the obligations of SR, for which the Office is the coordinator (multilateral and bilateral treaties), to inform the media and the public.

The Emergency Staff is well staffed by the ÚJD SR employees and can work in four sequences so as to ensure continuity of its work even during *prolonged* events. Each sequence has its management, consisting of a chairman, his assistant and team leaders of expert groups.

These groups are:

- Reactor safety group
 - Sub-group of site inspectors
- Radiation protection group
 - Sub-group of mobile dosimetry
- Logistical support group
- Intelligence group

Radiation Monitoring Network (RMS)

A radiation monitoring network is a system of technically, professionally and staffed specialist sites that are organisationally linked for the purpose of monitoring the radiation situation and collecting data on the radiation situation in the Slovak Republic.

ÚVZ SR establishes in cooperation with the Ministry of Health of the Slovak Republic, the Ministry of the Interior of the Slovak Republic, the Ministry of Defense of the Slovak Republic, the Ministry of Transport of the Slovak Republic, the Ministry of the Environment of the Slovak Republic, the Ministry of Agriculture and Rural Development of the Slovak Republic, the Ministry of Education, Science, Research and Sports of the Slovak Republic and the Ministry of Economy of the Slovak Republic a radiation monitoring network.

The Radiation Monitoring Network provides:

- a) Measurement of specified variables in selected environmental compartments through a system of monitoring points according to a timetable,
- b) An assessment of the exposure of the public and the contribution to the exposure due to activities leading to exposure in a normal radiation situation,
- c) Supporting documentation for systematic exposure guidance for the public,
- d) data on radioactive contamination of the environment, which are necessary for the decision-making on the implementation or termination of interventions, and measures to limit exposure in an emergency,
- e) data on the level of exposure for informing the public and for the international exchange of information on the radiological situation in the Slovak Republic.

The Radiation Monitoring Network consists of the Radiation Monitoring Network Headquarters, the permanent units and emergency units; Permanent units and emergency units monitor the radiation situation and immediately or within specified deadlines provide the measured data in the agreed manner and specified form to the Radiation Monitoring Network Headquarters.

In a normal radiation situation, monitoring is performed by permanent units of the Radiation Monitoring Network. In an emergency, monitoring is performed by permanent units of the Radiation Monitoring Network and by emergency units of the Radiation Monitoring Network. The emergency units are

activated according to the civil protection plans or according to the instructions of the Radiation Monitoring Network Headquarters.

Permanent Units include:

- a) in organisations designated by the MZ SR
 1. an early warning network, consisting of a system of monitoring points for continuous measurement of the dose equivalent intake in the Slovak Republic for immediate information on its increase above the level of natural radiation background,
 2. a network of thermo-luminescent dosimeters for measuring of the dose equivalent input in the territory of the Slovak Republic,
 3. monitoring points for monitoring radioactive contamination of the air,
 4. monitoring points for monitoring radioactive contamination of the environmental compartments,
 5. monitoring points for monitoring radioactive contamination of food chain components,
 6. mobile groups performing measurements of the dose equivalent input, in-situ measurements of radionuclides in the field, monitoring on route, sampling of environmental components and the food chain,
 7. laboratory groups performing analyses of environmental and food chain samples,
- b) a meteorological service providing data on the current weather conditions,
- c) *an early warning network consisting of a system of monitoring stations for continuous measurement of dose rate equivalent on the territory of the Slovak Republic for immediate notification of its increase above the level of natural background radiation, in organisations designated by the Ministry of the Environment of the SR.*

Emergency units include:

- a) an early warning network consisting of a system of monitoring sites for continuous measurement of dose rate equivalent on the territory of the Slovak Republic for immediate notification of its increase above the level of natural background radiation, in organisations designated by MV SR, Ministry of Defence of SR,
- b) Teledosimetric system of the operator of the nuclear installation performing continuous measurement of the dose equivalent intake and determination of radionuclides in the air around the nuclear installation in organizations designated by the MH SR,
- c) Monitoring points for monitoring of radioactive contamination of the air in organisations designated by the MŽP SR,
- d) Monitoring points for monitoring of radioactive contamination of environmental compartments in organisations designated by the Ministry of Agriculture and Rural Development of the SR, MV SR, MH SR and MŽP SR,
- e) Monitoring points for monitoring of radioactive contamination of food chain components in organisations designated by MV SR, MH SR and Ministry of Agriculture and Rural Development of SR,
- f) mobile groups in organisations designated by MV SR, Ministry of Defence of SR and MD SR, performing measurements of dose equivalent intake, in-situ measurements of radionuclides in the

- field, monitoring on route, sampling of environmental components and food chain components,
- g) laboratory groups created in organizations designated by the Ministry of Agriculture and Rural Development of SR, MV SR, MH SR, MŽP SR and Ministry of Defence SR, analysing environmental and food chain components samples,
 - h) monitoring points for monitoring radioactive contamination of environmental compartments, monitoring points for monitoring radioactive contamination of food chain components and laboratory groups in laboratories of universities performing monitoring of radioactive contamination of environmental components and food chain components proposed by the Ministry of Education, Science, Research and Sports of SR,
 - i) aviation groups established in organizations designated by the MV SR and the Ministry of Defence of SR.

Monitoring data (continuous measurement of dose equivalent intake in the Slovak Republic) are provided in real time by the Slovak Hydrometeorological Institute to the EURDEP network managed by the European Commission, whose data is available to all Member States through a protected website.

ÚRMS uses highly sophisticated systems to calculate forecasts of the radiation impact of releases of radioactive substances on the public and proposals for radiation protection measures for the public, to calculate doses or to calculate the radiation load along the path of movement of radiation substances. It sends data on the radiation situation in the Slovak Republic and data on radioactive contamination of the environment to the EURDEP network (Radiological Maps - European Commission (europa.eu)) and to the JRC EC in Ispra.

F.5.2.3 Emergency Documentation

Radiation countermeasures documentation is developed at the national level, forming part of the Public Protection Plan at the national level (National Emergency Plan), which contains measures to protect the population, health, property and the environment, as well as links to regional Public Protection Plans.

To cope with emergency at nuclear installations and their consequences on the environment, emergency documentation has been developed defining the procedure and organization of work during individual levels of emergency at various levels of the national emergency preparedness, described in chapter F.5.2.1.

The operator of nuclear installations has developed on-site emergency plans, which set out the emergency response organization and its implementation concerning management of an emergency and the protection of personnel, including health protection of employees in the medical response plan.

In addition, it has developed operating procedures, following the on-site emergency plan, which allow the recognition and classification of an emergency according to international recommendations, already based on a forecast by monitoring the specified symptoms, and which will allow the introduction of effective response to minimize or eliminate the consequences.

Public protection plans in the emergency planning zone are developed at a regional level, containing measures to protect the public, health, property and environment, as well as a link to the on-site emergency plan.

ÚJD SR has emergency procedures and regulations governing the activities of the ERC of ÚJD SR that are updated on a regular basis.

F.5.2.3.1 On-site Emergency Plans

On-site emergency plans and related documents are elaborated in such a way as to ensure the protection and training of staff in the event of a significant release of radioactive materials into the work environment or vicinity, and measures must be taken to protect the health of persons at the nuclear installation level or the population in its vicinity, whereas a system is in place to ensure that effective measures are put in place still before the actual release of radioactive materials.

The purpose of the on-site emergency plan is to ensure preparedness of NI staff for implementation of planned measures in case of an event at NI, with the emphasis on securing the basic objectives:

- to reduce the risk or mitigate the effects of the incident on the facility, employees and residents in the vicinity of the NI *directly at its source*,
- To prevent severe health damage (e. g. death or severe injury);
- To reduce the risk of probability of occurrence of stochastic effects on health (e.g. cancer and serious hereditary conditions).

The aim of the on-site emergency plan is to provide for activity of ERO, i. e. planning and preparation of organizational, personnel and material and technical means and measures to successfully cope with crisis and emergency according to the classified event.

For license holders, ERO consists of units that provide, in particular:

- technical support,
- logistical support and protection of personnel,
- information for state authorities and the public,
- monitoring radiological situation.

F.5.2.3.2 Public Protection Plans (Off-Site Emergency Plans)

Protective measures are part of the public protection plans, which are developed by the District Offices and municipalities located in the emergency planning zone of a nuclear installation, defined by a distance within 21 km in case of NPP V2 Jaslovské Bohunice and a distance of 20 km in case of NPP Mochovce. These public protection plans follow up the on-site emergency plan of the operator.

The Public Protection Plans developed for the territory of a region are subject to review by the ÚJD SR and approval by the MV SR. They contain a detailed description of implementation of measures, while selected measures include activity depending on the severity and the time sequence of an incident or accident, including available and usable resources for rescue works and the implementation of measures to protect the public. Part of the documentation is also the methodology of activities, databases and aids necessary for effective and correct decisions.

In an extraordinary event having a nature of a radiation incident at NI, the local authorities - the crisis management bodies, provide for measures in accordance with the public protection plans. These activities are carried out by the relevant crisis staffs that work together with the CCS of the Government. In order to avoid the risk of delays in the performance of tasks related to the public protection, the relevant crisis staffs are included in the organization of emergency response of the Slovak Republic.

In the event of an incident or accident at a nuclear facility with a release of radioactive substances, in accordance with the Act of NC SR No. 42/1994 Coll. on Civil Protection of the Public, it is the competent authority designated to deal with the crisis situation, which manages the rescue work within its territorial competence, provides the requirements of the lower levels for material and technical support, and prepares proposals for measures to deal with the crisis situation and the basis for taking decisions to effectively deal with the situation in the emergency planning zone:

- municipality and its mayor, if the event does not extend beyond the territory of the municipality,
- district office and the head of district office, if the event extends beyond the territory of a municipality but does not extend beyond the territory of the district,
- district office at the seat of a region and head of the District Office, if the event extends beyond the territory of a district and does not extend beyond the territory of a region,
- the Government of SR and the Prime Minister, if the event extends the territory of a region.

Each of these bodies manages rescue work within its territorial competence, provides the requirements of lower levels for material and technical support and prepares proposals for measures to deal with the crisis situation and the basis for taking decisions to effectively address the situation in the emergency planning zone.

F.5.2.3.3 Emergency Transport Rules

For shipment and transportation of fresh fuel and spent nuclear fuel, nuclear materials and radioactive waste, the licence holder for transport develops, according to Act No. 541/2004 Coll. and the ÚJD SR Decree No. 55/2006 Coll., an emergency transport rules (hereinafter referred to as "ETR"). The aim of these ETR is to ensure preventive and protective measures for the case of incident or accident during transport. The licence holder for transport of radioactive materials shall develop ETR for transport of above-mentioned materials on the roads and railways, which fall under its administration. After ETR is reviewed by ÚJD SR and by other involved bodies, these Rules are *forwarded to the minister of transport for approval*.

F.5.2.4 Warning and Notification Systems for the Public and Personnel

Warning of the public and notification of public authorities, organizations and staff is done in accordance with the Act No. 42/1994 Coll. on Civil Protection of the Public and Decree of the MV SR No. 388/2006 on the details of providing technical and operational conditions for the information system of civil protection.

The warning and notification system is provided by the licensee through a network of electronic sirens, early warning and notification to all employees and persons in the premises of nuclear installations

and in the case of *operators* of nuclear power plants also all inhabitants within 21 km area of the emergency planning zone of NPP Jaslovské Bohunice 3&4 and 20 km area of emergency planning zone of NPP Mochovce 1&2. It is fully interconnected with the national system, but if needed it can be activated and utilized also locally, for example in the event of flooding.

The nuclear installations, in order to speed up the notification, use a system of automatic telephone notification to individuals. This notification system is linking not only the emergency committees of nuclear installations, but also central government authorities, local government authorities, mayors of municipalities in the emergency planning zone.

The decision to initiate warning and notification of authorities, organisations and personnel is made by the Head of Shift Operations of JAVYS, a. s. or the Shift Engineer of SE, a. s. in the case of facilities for RAO and SNF management, in case of an event at NPPs linked with RAW management. Regular testing of the means of notification and warning system are performed once a month.

F.5.2.5 Systems to maintain emergency preparedness

At both sites of both operators (SE, a. s. and JAVYS, a. s.), shift exercises are organised twice a year and site emergency exercise once a year, attended by all employees of the nuclear facilities at the site, and interoperability emergency exercise, which is organised in cooperation with local government bodies and self-government bodies, ERC of ÚJD SR, or other ERO services (fire services, health services, armed forces, etc.) once every 3 years.

Observers and jury take part in the exercises and evaluate their conduct after the exercises are completed, and on the basis of their conclusions, measures are taken to improve the activities of the individual units of the ERO. These measures are subsequently monitored and their implementation is followed up by the plant management and the inspectors of the Authority.

F.5.2.6 Emergency Preparedness Equipment and Resources

They are designed to provide ERO operations with available instrumentation for rapid detection and ongoing evaluation of events. The following means of emergency response are available to ERO:

- Unit control rooms are the primary centre for the emergency response management;
- Emergency Control Centre is the workplace of the Emergency Committee. It is located in a shelter, which is activated in case of an incident or accident.
- Civil protection shelters are used as primary shelter for shift staff and intervening staff, and are *also* used for distributing the means of individual protection and specialized equipment for intervening units.
- Civil protection assembly points serve for gathering staff (not included in ERO) and other persons present on the territory of NI. These are equipped so that they create conditions for a short-term stay of staff using at the same time the individual protection equipment, and gathering staff before possible evacuation.
- In-house Medical Centre intended for the basic medical support, providing pre-medical and medical assistance and preparation for transfer of affected persons to specialized medical centres. Part of

the In-house Medical Centre is a decontamination node and workplaces for measuring internal contamination of persons.

- Communication means and equipment installed within the territory of NI:
 - a) public telephone network of the Slovak Telecom;
 - b) energy sector telephone network;
 - c) satellite handsets;
 - d) mobile telephones;
 - e) special purpose radio network;
 - f) Multi-tone paging network;
 - g) in-house radio and operating (Unit) radios.

F.5.3 International Treaties and Cooperation

F.5.3.1 Information System of the EU, ECURIE (European Community Urgent Radiological Information Exchange)

The Slovak Republic is bound by EU legislation. The most important act in the field of emergency preparedness is Council Decision 87/600/Euratom of 14 December 1987 *on Community measures for the rapid exchange of information in the event of a radiological emergency*, on the basis of which the ECURIE notification network operates.

After the SR joined the EU, it also became part of the ECURIE system where ÚJD SR is a Point of Contact and a competent body with a 24-hours permanent service. The Point of Contact for ECURIE system is identical with the point of contact for the IAEA Convention on Early Notification of a Nuclear Accident. Both contact points are provided for by ÚJD SR as the competent Authority. The contact point for the ECURIE system is backed-up by a warning point – at the MV SR. There is a national coordinator and its deputy appointed for the ECURIE system.

F.5.3.2 Conventions on Deposit with the International Atomic Energy Agency

The Slovak Republic is a signatory to international conventions on early notification in the event of a nuclear accident and on mutual assistance in the event of a nuclear accident, which ensures international cooperation in minimising the possible consequences of a nuclear accident. The Conventions concern, in particular, the technical and organisational arrangements for measures to reduce the effects of radiation on humans and the environment as a result of accidents at nuclear installations.

Convention on Early Notification of Nuclear Accident and Convention on Assistance in the event of a Nuclear Accident or Radiological Emergency

The Slovak Republic notified its succession to both Conventions on 10 February 1993 with the date of effect from 1 January 1993. The technical coordinator for meeting the provisions of the Convention is ÚJD SR, which is also the Point of Contact of SR for early notification of a nuclear accident. Through ÚJD SR, Slovakia regularly attends international exercises. Since the Conventions are in force, no

accident occurred on the territory of the Slovak Republic, which would require meeting the provisions of the Conventions. ÚJD SR regularly participates in exercises that test the functionality of the international system of notification of a nuclear accident, as provided by these Conventions.

The Slovak Republic has not yet registered its capabilities in the RANET system, which is a tool for coordinating the provision of assistance in accordance with the Convention on Assistance in the case of a Nuclear Accident or Radiological Emergency. Nevertheless, the Slovak Republic is ready to make its available resources available for assistance to members of the international community on the basis of requests made under this Convention.

F.5.3.3 Agreements and cooperation with neighbouring countries

In connection with Article 9 of the Convention on Early Notification of a Nuclear Accident the Slovak Republic succeeded to or concluded bilateral agreements in the field of early notification of a nuclear accident, information exchange and cooperation with all neighbouring countries. The agreements lay down the form, method and the scope of information provided to the contracting parties in case of an accident relating to nuclear installations or nuclear activities, and designate the coordinators of points of contact. The purpose of these agreements is to contribute to minimizing the risk and consequences of nuclear accidents, as well as to create a framework for bilateral cooperation and information exchange in areas of mutual interest in connection with peaceful use of nuclear energy and protection from radiation.

The Slovak Republic has concluded bilateral agreements with all neighbouring countries on cooperation on border waters and is a member of the international "Convention on Cooperation for the Protection and Sustainable Use of the Danube River", which focuses on the entire Danube river basin, which covers 96% of the territory within the Slovak Republic. These agreements and conventions also include information exchange and cooperation in the event of accidents. The sponsor for this type of bilateral agreements and of the Convention is the Water Section of the MŽP SR.

F.5.3.4 Cooperation between the EU Member States in the field of Civil Protection

Decision No 1313/2013/EU of the European Parliament and of the Council of 17 December 2013 on a Union Civil Protection Mechanism

Decision No 1313/2013/EU of the European Parliament and of the Council on a Union Civil Protection Mechanism establishes a Community mechanism to facilitate reinforced cooperation between the Community and the Member States in civil protection assistance interventions in the event of major emergencies or imminent threats thereof, including an accident at NI (hereinafter referred to as the "Mechanism").

The Mechanism shall aim to strengthen the cooperation between the Union and the Member States and to facilitate coordination in the field of civil protection in order to improve the effectiveness of systems for preventing, preparing for and responding to natural and man-made disasters. Civil protection cooperation shall include prevention and preparedness actions and actions to assist in responding to the immediate adverse consequences of a disaster and inside or outside the Union.

The protection to be ensured by the Mechanism covers primarily people, but also the environment and property, including cultural heritage, against all kinds of natural and man-made disasters, including cultural heritage, against all kinds of natural and man-made disasters, including environmental disasters, marine pollution and acute health emergencies, occurring inside or outside the Union.

Decision No 1313/2013/EU of the European Parliament and of the Council lays down the rules for granting financial assistance for:

- a) Actions under the Community Mechanism to support the strengthening of cooperation in civil protection assistance interventions;
- b) Measures aimed at preventing or limiting the consequences of an emergency; and
- c) Actions designed to improve the Community's preparedness for emergency response, including actions to raise awareness of EU citizens.

F.5.3.5 Slovakia's participation in international exercises

In terms of emergency preparedness ÚJD SR is involved in two systems of international warning and notification: the ECURIE system, which works within the EU, and in the USIE system, which was established in compliance with the Convention on Early Notification of a Nuclear Accident, which is coordinated by the IAEA. Both of these international organizations carry out regular exercises to verify the connection and response. *ÚJD SR, as the competent body for the SR and the Central Monitoring and Control Centre of the Crisis Management Section of the MV SR, as warning points for the SR, have responded on time in all these exercises over the past years.*

In 2023, the Slovak Republic participated in the preparation of the international INEX 6 exercise, which was subsequently conducted in 2024 as "table top" exercise. This exercise was the sixth international exercise of the INEX series organised by the OECD/NEA. The exercise addressed issues related to the long-term management of the recovery phase, one year after the end of a radiological event that occurred during the transport of radioactive materials. The main significance of the exercise was the possibility of verifying the functioning of communication, interconnection of individual state administration bodies and organisations involved in emergency planning in the event of an incident during transport of radioactive materials, in the light of the current legislation of the Slovak Republic and EU requirements. The aim was to test the decision-making process in the implementation of long-term protective measures (as well as the ability to consider the consequences of such measures), the justification and optimisation of the measures implemented not only in terms of radiation protection (e.g. psychological aspects), but also in other related measures. The exercise was intended to check the appropriateness of the use of existing legislation, agreements and procedures relating to similar events, as well as to identify good practice. In addition to these exercises, at least one major international exercise is conducted each year to test the functionality of the EU ECUREX early warning system for nuclear and radiological emergencies, as well as similarly oriented exercises of the IAEA ConvEx series. Slovakia actively participates in all these exercises.

F.6 Decommissioning

Article 26 of the Joint Convention

Decommissioning

Each Contracting Party shall take the appropriate steps to ensure the safety of decommissioning of a nuclear facility.

Such steps shall ensure that

- i) Qualified staff and adequate financial resources are available;*
- ii) The provisions of article 24 with respect to operational radiation protection, discharges and unplanned and uncontrolled releases are applied;*
- iii) The provisions of article 25 with respect to emergency preparedness are applied; and*
- iv) Records of information important to decommissioning are kept.*

Qualified personnel throughout the decommissioning process has been required since 1998 under the Atomic Act (currently as Act No. 541/2004 Coll. (Atomic Act)) and when applying for a licence for the decommissioning phase, the licence holder is obliged to submit to the ÚJD SR for review documentation on the system of training of personnel, training programmes for selected and qualified personnel and evidence of compliance with the qualification requirements of selected and qualified personnel.

All works in the decommissioning stage are subsequently performed by personnel, which is specially instructed together with practical exercises on models prior to implementation (according to work schedule) of technically demanding work operations.

Financial resources. Since 1995, the licensee for NI is obliged to (currently as Atomic Act No. 541/2004 Coll. and Act on the National Nuclear Fund No. 308/2018 Coll.) provide earmarked funds during operation to cover costs associated with decommissioning. These funds form part of the revenues of the National Nuclear Fund for the decommissioning of NI and for the SNF and RAW management (hereinafter referred to as the Fund). Additions to and use of the resources of the Fund are described in detail in section F.2.2. Another source of income for the Fund - since 1 January 2011 – are the levies collected by the transmission system operator and distribution system operators, and are intended to cover the “historical debt” for the period 1972 – 1994, when operators were not legally bound to pay contributions for the decommissioning of NIs and for the SNF and RAW management. The disbursement of funds pooled under the above-mentioned Government Regulation was introduced only after its approval by the EC by Decision of 20 February 2013. Until 1995, the State covered all decommissioning costs of NPP A1, and from 1995 the decommissioning of this NPP is covered from the Fund. Some activities after 1995, such as export of spent nuclear fuel to the Russian Federation, were paid for by the State through the Fund.

Application of radiation protection measures is currently provided for in accordance with the requirements of the Act No. 87/2018 Coll. on radiation protection. Continuity of radiation protection procedures and requirements applied during operation (see F.4) is maintained in accordance with the safety documentation submitted by the operator to the state regulatory body when applying for decommissioning. This documentation includes decommissioning plan characterizing radiation sources in the given premises and assurance of radiation protection of personnel and surrounding during the

decommissioning process. It also analyses possible emergency conditions with description of mitigation procedures and appraisal of the consequences (dose loads of personnel).

Routine activities during decommissioning are performed according to operational procedures. Non-standard activities are performed according to approved work schedules. Detailed procedure of works is described for every performed activity enabling to achieve pre-set success criteria. Scope and time of performed works is specified, dose loads of personnel when using specific protective devices is evaluated.

The issues of exposure regulation are regularly analysed during the meetings of the "ALARA" commission prior to approval of work schedules. Dose loads are regularly evaluated by the Nuclear Safety Committee. The evaluation of personnel dose load is periodically discussed with ÚVZ SR representative with an emphasis on the most exposed works.

Limits for gaseous and liquid discharges are set by the Health Officer and are part of the documentation approved by the ÚJD SR. Gaseous discharges reach units of up to tens of MBq, representing units of % of the annual limit. Liquid effluents reach values (except tritium) of tenths to units of MBq, representing tenths to units of % of the annual limit. Tritium activity in liquid effluents represents tenths to units of % of the annual limit.

Application of emergency measures is currently ensured in accordance with the requirements of the Act No. 541/2004 Coll. (Atomic Act) (see F.5).

Documentation for authorization of the decommissioning stage includes, in accordance with the requirements of Act No. 541/2004 Coll. (Atomic Act) and ÚJD SR Decree No. 58/2006:

- Limits and conditions of safe decommissioning;
- Quality system documentation and requirements for quality decommissioning;
- On-site emergency plan;
- Plan of decommissioning stage;
- Concept of decommissioning for the period after the authorized decommissioning stage;
- Plan of physical protection, including a contract with the Police Corps, as well as description of the aviation activities at the premises or near NI;
- Radioactive waste management and shipment plan and plan for conventional waste management from decommissioning;
- Document providing evidence on financial coverage of liability for nuclear damage;
- Program of inspections of selected equipment;
- Operational procedures determined by ÚJD SR;
- Professional training system for employees;
- Training programs for licensed employees;
- Training programs for professionally competent staff;
- Documents on meeting the qualification requirements for licensed staff and professionally competent staff;
- Public protection plan for regions in the emergency planning zone;
- Modifications to boundaries of the nuclear installation;

- Modifications to the size of the emergency planning zone of the nuclear installation;
- Categorization of classified equipment into safety classes.

Decommissioning Plan describes the status of nuclear installation at the beginning and at the end of the relevant decommissioning stage and planned activities in the given stage, including their impact on the personnel of the nuclear installation and surrounding of the nuclear installation; it contains a statement that financial means necessary for implementation of the described activities will be provided and that the capacity of facilities for SNF and RAW management will be in accordance with the decommissioning strategy and schedule. The decommissioning stage plan includes also an analysis of potential emergency situations and their consequences. Plan of decommissioning stage also contains an analysis of possible emergencies and their consequences. Part of the decommissioning stage plan is the outcome of control of radiation situation completed during the previous stage of decommissioning or shutting down the operation of NI and draft program of controls and monitoring of radiation situation after completing that stage of decommissioning.

Records of decommissioning-relevant information are kept in accordance with approved Quality Assurance Programmes for operation and decommissioning. Their list is presented in the decommissioning conceptual plan submitted prior to the nuclear installation commissioning.

Final decommissioning documentation includes:

- final description of the site of the decommissioned nuclear installation and of all works performed during decommissioning,
- summary data about amount and activity of disposed or long-term stored radioactive waste and about amount of other waste and materials released into environment,
- list of data to be kept after the decommissioning completion with storage period identification,
- results of the final independent radiation situation control supported by an independent verification including a statement of the regulatory authority for radiation protection.

The final documentation on decommissioning presents criteria for release of the site for unlimited utilization and contains data to what extent they were met. In case the criteria were not fully met, it presents limitations in the land use and measures taken to ensure control over the area.

G Safety of Spent Fuel Management (SNF)

G.1 General Safety Requirements

Article 4 of the Joint Convention

General Safety Requirements

Each Contracting Party shall take the appropriate steps to ensure that at all stages of spent fuel management, individuals, society and the environment are adequately protected against radiological hazards.

In so doing, each Contracting Party shall take the appropriate steps to

- i) Ensure that criticality and removal of residual heat generated during spent fuel management are adequately addressed;*
- ii) Ensure that the generation of radioactive waste associated with spent fuel management is kept to the minimum practicable, consistent with the type of fuel cycle policy adopted;*
- iii) Take into account interdependencies among the different steps of in spent fuel management;*
- iv) Provide for effective protection of individuals, society and the environment by applying at the national level suitable protective methods as approved by the regulatory body, in the framework of its national legislation, which has due regard to internationally endorsed criteria and standards;*
- v) Take into account the biological, chemical and other hazards that may be associated with spent fuel management;*
- vi) Strive to avoid actions that impose reasonably predictable impact on future generations greater than those permitted for the current generation;*
- vii) Aim to avoid imposing undue burdens on future generations.*

General safety aspects of spent fuel management are described in Chapter F.

Nuclear safety during siting, design, construction, commissioning, operation and decommissioning is subject to fulfilment of general safety requirements for nuclear installations and subject to, special requirements for nuclear installations with nuclear reactor and special requirements for nuclear installations for treatment, conditioning or storage of SNF. Fulfilment of safety requirements is required by legislation and controlled through regulatory body inspections. The requirements for nuclear safety of nuclear installations must be complied with at the stages of their siting, design, construction, commissioning, operation and decommissioning and their fulfilment is manifested in the documentation prescribed by legislation, assessment or approval of which is a condition for issuance of relevant license.

Fulfilment of the following conditions of safe SNF management is required by legislation since 1976 (safety documentation and its assessment by regulatory authorities) with detailed safety analyses for particular stages of nuclear installation since 1978 - 1979:

- maintaining sub-criticality,
- residual heat removal,
- minimizing effects of ionizing radiation on the operating personnel, public and environment in accordance with international criteria and standards,
- consideration of properties affecting nuclear safety, such as toxicity, flammability, explosivity and other hazardous properties, including consideration of the interdependence of the various steps in the SNF management.

Meeting the condition of minimizing RAW production in connection with SNF management has been explicitly required by the legislation since 1987.

Assessment of the impact on future generations is part of impact assessment of activities on the environment (valid in full since 1994) and is a part of the National Strategy for Spent Fuel Management (or RAW). Future generations are entitled to the same level of protection as the current one. This results in a requirement to assess (Act No. 24/2006 Coll. on environmental impacts assessment) and to demonstrate (Act No. 541/2004 Coll.) the Atomic Act and Act No. 87/2018 Coll. on radiation protection) that the waste disposed in a repository shall never cause radiation load to the public that is higher than the one that is admissible at present.

The fulfilment or provision of all these requirements shall be documented by the licence holder in the preliminary safety report and in the safety reports submitted prior to the construction of the NI and prior to the commissioning of the NI. Periodic reviews are carried out during operation in order to ensure that the physical state and operation of the nuclear installation is constantly in line with the design and applicable safety requirements. Operators have a quality assurance system in place covering all activities relevant to safety. Following safety analyses, tests, reviews and operating experience, operators have defined limits and conditions, observance of which is strictly controlled during operation. Written procedures are developed to handle or mitigate the consequences of predictable events and accidents. The application of the “defence in-depth” principle also contributes to the prevention of incidents and accidents.

G.1.1 Safety Reviews and Inspections at Existing Facilities

Article 5 of the Joint Convention

Existing facilities

Each Contracting Party shall take the appropriate steps to review the safety of any spent fuel management facility existing at the time the Convention enters into force for that Contracting Party, and to ensure that, if necessary, all reasonably practicable improvements are made to upgrade the safety of such facility.

The list and the description of facilities for spent fuel management is found in D.1.

Safety assessment of spent fuel management facilities is covered under section G.4.

In case some safety aspects were not assessed for existing facilities in the respective time of their siting, construction and operation, being not required by the previous legislation, it has been performed later in accordance with the altering legislation in the respective stage of the nuclear facility life cycle. Since 1998, ÚJD SR can bind authorization (licence) on fulfilment of conditions (this means: the regulatory body could ask for additional safety assessment and it has applied this possibility in case of NPP A1 and NPP V1) and since 2004 the duty of periodical safety assessment with periodicity of 10 years is explicitly established.

Based on the recommendations from regular inspections of the facilities by regulatory authorities and from international missions (IAEA), measures to increase safety of nuclear installations are required.

G.2 Siting of Facilities

Article 6 of the Joint Convention

Siting of proposed facilities

1. *Each Contracting Party shall take the appropriate steps to ensure that procedures are established and implemented for*

a proposed spent fuel management facility

- i) *To evaluate all relevant site-related factors likely to affect the safety of such facility during its operating lifetime;*
 - ii) *To evaluate the likely safety impact of such facility on individuals, society and the environment;*
 - iii) *To make information on the safety of such a facility available to members of the public;*
 - iv) *To consult Contracting Parties in the vicinity of such a facility, insofar as they are likely to be affected by that facility, and provide them, upon their request, with general data relating to the facility to enable them to evaluate the likely safety impact of the facility upon their territory.*
2. *In so doing, each Contracting Party shall take the appropriate steps to ensure that such facilities shall not have unacceptable effects on other Contracting Parties by being sited in accordance with the general safety requirements of Article 4.*

G.2.1 Siting Legislation

The siting of a nuclear installation, *except for the construction of a nuclear installation (reactor type of facility)*, approval from the ÚJD SR is required under Act No. 541/2004 Coll. (Atomic Act). Assessment of all factors concerning the site, which could influence the safety of the nuclear installation and its safety-related impacts on individuals, society and environment, is required by legislation since 1979 and in full scale for the environment since 1994.

The Atomic Act was several times amended in the period of 2017 – 2024 for reasons connected with the transposition of EU legal instruments or by introducing a siting procedure of a nuclear installation, but only of a reactor type.

As a result, the authorisation for siting of NPPs is a two-step process. At first stage it is not necessary to submit documentation demonstrating the civil and structural design of the building, no decision is taken about siting specific buildings of nuclear sources. This is dealt with in the authorization process (zoning and building proceedings).

In order to assess the impact of a nuclear installation on the environment, as well as the potential impact of the surrounding environment on the nuclear installation, the ÚJD SR issues an opinion pursuant to Act No. 24/2006 Coll. on Environmental Impact Assessment as the building authority for constructions containing nuclear installations, acting in accordance with the Act No. 50/1976 Coll. (Building Act).

The ÚJD SR decides on the issue of an approval for the siting the construction of a nuclear installation *or an authorisation for the siting of a nuclear installation*, based on a written application accompanied by specified documentation and based on a statement by the EC in accordance with the following regulations:

- Article 37 of the Euratom Treaty;
- Council Regulation (Euratom) No. 2587/1999 of 2 December 1999, defining the investment projects to be communicated to the European Commission in accordance with Article 41 of the Treaty establishing the European Atomic Energy Community;
- Commission Regulation (EC) No. 1209/2000 of 8 June 2000 on the communications prescribed in Article 41 of the Treaty establishing the European Atomic Energy Community as amended by Commission Regulation (Euratom) No. 1352/2003 of 23 July 2003.

Special conditions for approval of siting of construction of a nuclear installation *or authorisation for siting a nuclear installation*, is the following documentation:

1. Assessment of impact of a nuclear installation on the environment, as well as evaluating the potential impact of the surroundings on the nuclear installation;
2. Quality requirements for a nuclear installation;
3. Proposal of nuclear installation boundaries.
4. Proposed size of the emergency planning zone for a nuclear installation;
5. Reference safety report.
6. Reference report on the decommissioning method.
7. Project proposal for physical – technical solution at nuclear installation on the level of reference project.
8. Reference report on the method of RAW and SNF management.

G.2.2 Siting of Spent Nuclear Fuel Management Facilities

The siting of facilities for the management of SNF did not fully comply with the requirements of the Convention only for NPP A1 (sited in the late 1950s) and NPP V1 (sited in the early 1970s). The *repatriation* of SNF from NPP A1 to the Russian Federation was completed in 1999, since then the decommissioning of the nuclear facility has been carried out in the framework of the management of RAW produced from SNF. The safety assessment of the facility and its safety impact on the environment was carried out in accordance with the legislation in force at the end of the 1990s.

Safety assessment of NPP V1 was performed after the reconstruction of NPP V1 in 2001.

The nuclear safety requirements of a nuclear installation at the siting stage are characterised by the characteristics of the site. The characteristics that **preclude** the siting of a nuclear installation in this area are listed in Annex 2 of Decree No. 430/2011:

- a) Under conditions of operation, abnormal operation or in the event of emergency, the following cannot be ensured
 - i. Compliance with the prescribed doses to the population and the prescribed level of noise and vibrations affecting humans including neighbouring land plots and buildings,
 - ii. Protection of life, health and property from the consequences of emergencies,
 - iii. Protection against the harmful effects of extreme weather conditions and floods on nuclear installation,
- b) the area is threatened by landslides or subsidence, overflows of mine water or strong tremors as a result of mining activities, gas or oil extraction or groundwater reserves,
- c) geodynamic and karst phenomena threatening the stability of the rock mass occur in the area, such as landslides, movement and seismically active faults, liquefaction of soils, tectonic activity or other phenomena that may change the inclination of the surface of the surroundings beyond the established technological requirements,
- d) the protection zones of natural healing resources and natural mineral resources, areas with climatic conditions for healing, spas and spa areas, ground and surface sources of drinking water; *protection zones of water sources and protected water management areas within the meaning of Act No. 364/2004 Coll. on waters,*

- e) There are declared mining areas with the extraction of raw materials in the territory,
- f) The area extends into the protection zone of industrial or other economic objects, with which undesirable operational collisions could arise,
- g) The density and distribution of the population in the territory prevent the effective application of emergency preparedness measures,
- h) It is not possible to ensure a sufficiently safe and reliable feeding of the output of the planned installed capacity,
- i) In the case of a repository, the existing high or difficult to predict risk arising from external and man-made events or if the evolution of these events cannot be reliably predicted over the design lifetime.

With regard of SNF management at NPP V1, NPP V2, the following aspects of siting of NPP V1, V2 are important:

- Transports of SNF are performed exclusively on the railway communications of (on a railway siding on the site of NPP Jaslovské Bohunice and JAVYS, a. s.),
- When siting, principle of 3 km exclusion zone for permanent settlement is applied,
- ISFS was built and put into operation in 1987 at the NPP Jaslovské Bohunice site, in the immediate vicinity of NPP V1.

The seismic load of the Jaslovské Bohunice site was reassessed (in the framework of the NPP V1, V2 and ISFS safety improvement projects) and consequently measures for seismic reinforcement of the NPP V1 and ISFS facilities were implemented (*see National Report under the CNS*).

In a similar matter the Mochovce site was also reassessed (see National Report under the CNS).

G.3 Design and Construction

Article 7 of the Joint Convention

Design and Construction

Each Contracting Party shall take the appropriate steps to ensure that

- i) *The design and construction of a spent fuel management facility provide for suitable measures to limit possible radiological impacts on individuals, society and the environment, including those from discharges or uncontrolled releases;*
- ii) *At the design stage, conceptual plans and, as necessary, technical provisions for the decommissioning of a spent fuel management facility are taken into account;*
- iii) *The technologies incorporated in the design and construction of a spent fuel management facility are supported by experience, testing or analysis.*

Legislative requirements for provision of suitable measures to restrain radiation impacts of facilities for SNF management including impacts from discharges or leakages are valid since the end of 70-ties. Evidence on their fulfilment is submitted in the documentation to be attached to the application for approval of nuclear installation construction. Documents on fulfilment of safety requirements including requirements on quality of technologies have been later complemented for NPP A1 and NPP V1 (see G.2.2).

Documentation for conceptual plans for future decommissioning of nuclear installations already during design stage are legally required since 1998. Preliminary conceptual plans are submitted with the

documentation to be approved according to the Atomic Act. For those nuclear installations, which did not have elaborated Conceptual Decommissioning Plans during design and construction, these documents have been additionally completed by 2000. The preliminary design of the repository closure method, in particular stabilisation, overlay and construction of a drainage system for the overlay, is part of the Pre-operational Safety Report.

The building procedure for the construction of nuclear installations is governed by Sections 43 to 85 of Act No. 50/1976 Coll. (Building Act) and Act No. 541/2004 Coll. (Atomic Act). Construction of a nuclear installation may be carried out only by the holder of a valid building permit. The construction procedure is also covered by Decree No 532/2002 of the MŽP SR, which lays down details on general technical requirements for construction and on general technical requirements for buildings used by persons with reduced mobility and orientation. The ÚJD SR shall decide about issuing a building permit for the construction of a nuclear facility in accordance with Section 66 of Act No. 50/1976 Coll. (Building Act).

Documentation required for an application for a building permit to construct a nuclear facility:

- Preliminary safety report providing evidence of meeting the legal requirements on nuclear safety based on the data considered in the design,
- Project documentation needed for building permit proceedings,
- Preliminary plan of management of radioactive waste, spent nuclear fuel including their transport,
- Preliminary conceptual decommissioning plan,
- Classification of classified equipment into the safety classes,
- Preliminary physical protection plan,
- Quality *management* system documentation and nuclear installation quality requirements and evaluation thereof,
- Preliminary on-site emergency plan of a *nuclear facility*,
- preliminary limits and conditions for safe operation or *L&Cs for safe operation*,
- preliminary inspection schedule for the nuclear facility prior to its operation,
- Preliminary outline of the boundaries of the nuclear facility, *their definition or changes thereof*,
- preliminary definition of the size of the emergency planning zone for a nuclear facility, *its definition or changes thereof*,
- other documentation required under the Building Act.

Constructions of nuclear installations involving special interventions into the earth crust, such as deep geological repositories, are governed by the Act No. 44/1988 Coll. on Protection and Utilization of Mineral Resources (Mining Act).

Requirements for the design and construction of spent nuclear fuel storage:

- a) Securing sub-criticality at 5 % min. during all operational conditions, 2 % during operational events, either by suitable set-up of spent nuclear fuel or by placing a solid neutron absorbent into the storage space; efficiency of the solid absorbent use is proved by calculation or experiment,

- b) the permanent removal of residual heat generated by the spent fuel from its storage area; the removal of heat shall be ensured by natural or forced coolant flow so that the temperature of the spent fuel cladding in any part of the spent fuel does not exceed the limit value,
- c) its complete or partial decontamination,
- d) safe handling of spent nuclear fuel,
- e) Record keeping and control of stored spent nuclear fuel,
- f) Ensuring adequate physical protection of storage area,
- g) Prevention of heavy objects falling into the area of spent fuel storage,
- h) Effective purification, re-fill and capture of cooling media leakages in wet storage of spent fuel.

Building structures, process systems and equipment relevant to the nuclear safety of a nuclear installation shall be designed, manufactured, installed and tested to ensure their reliable function. The manufacturers and suppliers of the classified equipment (equipment important in terms of nuclear safety), their materials and accessories are obliged to present results of selected quality production inspections and tests of properties of components, equipment, base material, welded joints and weld deposits, material properties and composition as well as findings and removed deficiencies identified by inspection. In cases when special technological procedures may influence resulting properties of used materials and products, performance of additional tests must be ensured in advance (e. g. keeping evidence samples). Control systems must enable monitoring, measurement, registration, and management of values and systems important in terms of nuclear safety. Devices and controls shall be designed and arranged so as to allow that maintenance has constantly enough information on operation of the nuclear installation. The control room shall enable safe and reliable control of the operation.

The safety concept of RAW and spent fuel management facilities, the principles of “defence in-depth” strategy are applied accordingly, which are generally used worldwide for design and operation of nuclear power plants. When assessing the safety of NI, ÚJD SR assesses the ability of the facilities to fulfil the safety functions in accordance with the design in order to ensure the required level of defence-in-depth.

"Completion (extension) of SNF storage capacities" within the ISFS is currently in the phase of commissioning, which is designed as dry storage.

G.4 Assessment of Safety of Facilities

Article 8 of the Joint Convention

Assessment of Safety of Facilities

Each Contracting Party shall take the appropriate steps to ensure that

- i) *Before construction of a spent fuel management facility, a systematic safety assessment and an environmental assessment appropriate to the hazard presented by the facility and covering its operating lifetime shall be carried out;*
- ii) *Before the operation of a spent fuel management facility, updated and detailed versions of the safety assessment and of the environmental assessment shall be prepared when deemed necessary to complement the assessment referred to in paragraph i).*

G.4.1 General Principles of Safety Assessment

Basic requirements for nuclear safety and safety assessment are determined by the Atomic Act (No. 541/2004 Coll.).

Legislation in 1970s-1980s introduced the obligation for the licence holder to submit a safety report before each permit is issued for each stage of lifetime of a NI (siting, construction, operation), which includes an assessment of the radiation risks to the facility itself and its surroundings. A systematic comprehensive safety and environmental assessment of the impact of a nuclear installation (NI) on the site and the surrounding area has been required by Slovak legislation since 1994 to be submitted prior to siting. Increasing requirements for the safety of NIs are being continuously reflected in the legislation.

Similar requirements, including an assessment of the risks arising from their existence, shall apply to post-closure periods for a SNF repository and for a RAW repository.

During the operation or during decommissioning of a nuclear installation the licensee is obliged to perform periodical, complex and systematic assessment of nuclear safety taking into account the latest knowledge in the field of nuclear safety assessment and to adopt measures to eliminate the deficiencies found. The licensee is obliged to perform periodical safety assessment since 2004 based on the requirements of the Atomic Act No. 541/2004 Coll. within the intervals and the extent laid down by a binding legal regulation issued by ÚJD SR in 2006 and amended in 2012, 2016 and 2019.

Based on ÚJD SR Decision, in 2011 the licensee prepared a program for monitoring the condition of the ISFS and stored spent nuclear fuel and periodically submits reports evaluating the program.

In connection with the decision of the European Commission to perform Stress Tests on nuclear facilities as a result of events at the Fukushima NPP, Japan, ÚJD SR asked the licensee to reconsider the response to similar potential events.

A programme to reassess the response of the ISFS to Fukushima-type events was developed in 2011, followed by an evaluation of the programme in 2012. The results of the evaluation were incorporated into the operating procedures and corrective actions were implemented to enhance nuclear safety (for details see chap. D.1.2).

The safety of facilities for the management of SNF and RAW, in particular those that are part of nuclear power plants, is assessed by international missions (in particular by the IAEA).

Examples of the safety reports and their assessments by the regulatory bodies and an overview of the international safety missions to the facilities for the management of SNF and RAW is given in the Annex VII.

G.4.2 Operational Safety Assessment of Spent Fuel Management Facilities and Systems

Safety assessment of transport systems and of SNF management is part of the overall safety assessment of NPP Jaslovské Bohunice, NPP Mochovce Units and JAVYS, a. s. and is conducted as follows:

- By the licensee in regular reports and evaluations of nuclear safety, radiation safety, occupational health and safety, technical security of equipment and operation and in evaluations of spent fuel handling, or shipments, sent to ÚJD SR and also in overall annual assessments of the nuclear fuel cycle within the quality system at the individual NPPs in operation.
- By an independent science, research and design engineering organizations with the relevant licenses from ÚJD SR (VUJE, a. s. and other) in operational safety reports and analyses.
- ÚJD SR inspections of Units of NPP Jaslovské Bohunice, NPP Mochovce and JAVYS, a. s..

G.5 Operation of Facilities

Article 9 of the Joint Convention

Operation of Facilities

Each Contracting Party shall take the appropriate steps to ensure that

- i) The licence to operate a spent fuel management facility is based upon appropriate assessments as specified in Article 8 and is conditional on the completion of a commissioning program demonstrating that the facility, as constructed, is consistent with design and safety requirements;*
- ii) operational limits and conditions derived from tests, operational experience and the assessments, as specified in Article 8, are defined and revised as necessary;*
- iii) operation, maintenance, monitoring, inspection and testing of a spent fuel management facility are conducted in accordance with established procedures;*
- iv) engineering and technical support in all safety-related fields are available throughout the operating lifetime of a spent fuel management facility;*
- v) incidents significant to safety are reported in a timely manner by the holder of licence to the regulatory body;*
- vi) programs to collect and analyse relevant operating experience are established and that the results are acted upon, where appropriate;*
- vii) decommissioning plans for a spent fuel management facility are prepared and updated, as necessary, using information obtained during the operating lifetime of that facility, and are reviewed by the regulatory body.*

G.5.1 Commissioning

As part of commissioning of Units of NPP V1, NPP V2 according to the programs of non-active and active tests the transport technology part was tested in connection with the reactor and units auxiliary system tests. Based on the results of tests the operational procedures for transport technology part, reactor and units were specified.

The transport technology part equipment and systems for spent fuel management were tested under non-active and active conditions of the Units.

After the completion of pre-complex testing, complex testing of each system of the transport technological part, the "Evaluation of pre-complex testing, complex testing" was prepared, which documented the course and fulfilment of the goals set.

Based on the negative experience with tightness of simple linings at most of WWER-440 units, the construction of pool lining at NPP V2 was modified by Energoprojekt (general designer for NPP V1, V2) and GDt SKODA project from the original simple stainless-steel lining to a double lining with leak outlet between the linings.

All other nuclear installations have been commissioned according to standard programs approved by regulatory bodies in line with the legislation, based on the IAEA recommendations.

G.5.2 Legislative requirements for commissioning and operation

The requirements for commissioning and operation of nuclear installations are laid down in Section 19 of Act No. 541/2004 Coll. Requirements for the management of spent nuclear fuel are laid down in Section 21 of Act no. 541/2004 Coll. (Atomic Act).

This Act further specifies the requirements for nuclear safety, professional competence, quality assurance, physical protection, notification and assessment of operational events and emergency preparedness. Further details and other requirements are in the relevant ÚJD SR Decrees (see Annex VI.).

Authorisation for commissioning and operation of a nuclear installation shall be issued by the ÚJD SR upon submission of a written application, accompanied by the following documentation, e.g.:

- Limits & Conditions of safe operation,
- List of classified equipment as classified into safety classes,
- Programmes for the testing of classified equipment designated by the Authority,
- Nuclear installation commissioning program, split up into stages,
- Programme of in-service inspections of classified equipment,
- Quality system documentation and requirements on the quality of the nuclear installation, and their evaluation,
- Operational procedures determined by the ÚJD SR,
- On-site emergency plan,
- Pre-operational safety report,
- For nuclear installations with a nuclear reactor, a probabilistic assessment of the safety of operation for a shut-down reactor and for low power levels as well as for the full power of the reactor,
- Physical Protection Plan, including contract with the Police Corps,
- RAW and SNF management plan, including their transport,
- Conceptual plan of decommissioning of the nuclear installation,
- Evidence of financial security for liability for nuclear damage, except for the repository,
- Staff training system, etc.

In its activities, the licensee shall also apply the recommendations contained in IAEA Safety Guides such as SC 50-C-O "Safety in the Operation of Nuclear Power Plants, "GSR Part 2 Leadership and Management for Safety".

G.5.3 Limits and Conditions (L&Cs) for Spent Nuclear Fuel Management

Limits and Conditions of safe operation is the basic legislative document containing permissible values of parameters of nuclear installation facilities and defines its operating regimes. The document is developed on the basis of legislative requirements (Act No. 541/2004 Coll. (Atomic Act) and ÚJD SR Decree No. 58/2006), with regard to which the license holder shall:

- Submit the approved preliminary L&C before issuing an authorization for construction of NI by ÚJD SR;
- Submit the approved L&C before issuing an authorization for commissioning of NI and operation of NI by ÚJD SR;
- Any subsequent changes to L&C shall be submitted to ÚJD SR for approval, supported by their safety justification;
- Comply with the L&C, while ÚJD SR ensures control of compliance.

The document for spent fuel management facilities contains the basic limits and conditions:

For the SNF pool:

- Water level in the ponds for storage and refuelling (assurance of sufficient water layer to protect personnel against radiation from fuel).
- H^3BO^3 concentration in the storage pool (ensuring sub-criticality in the fuel pool).
- Cooling water of the storage pool (ensure residual heat removal from SNF) for the transport means.
- *means for checking the condition of safety barriers,*
- *parameters monitoring the condition of safety barriers,*
- *technical means, the failure of which creates the initiating conditions for the occurrence of an incident or accident,*
- *parameters whose change in value creates the initiating conditions for accidents and incidents,*
- *the means intended to mitigate the consequences of design accidents,*
- *the minimum number of personnel present on a shift and their assignment to work functions.*

Documents containing Limits and Conditions for ISFS:

Limits and Conditions	
13-L&C-001	Limits & Conditions for safe operation of ISFS
13-L&C-002	Justification for the L&Cs for safe operation of ISFS

G.5.4 Management Documentation for Operation and Maintenance of Facilities for Spent Nuclear Fuel Management

Management of SNF at NPP units of WWER type is part of the nuclear fuel cycle, for which the relevant *quality assurance* management documentation and its subordinate operational documentation are prepared:

- a) Process documentation:

- "Operation of Nuclear Power Plants" directive
 - Record keeping and control of nuclear materials;
 - Handling, shipment and storage of spent nuclear.
- b) Technological operational procedures:
- Transport of spent nuclear fuel from WWER-440 units to the ISFS, storage and handling of SNF before shipment for reprocessing,
 - Operation of electrical lifting equipment of ISFS,
 - Inspection stand SVYP-440 for SNF monitoring.

Reviews, revisions, maintenance, tests, and complex care of equipment for SNF management are performed according to the quality documentation and approved schedules. Obligations, responsibilities and competencies of the personnel are defined in descriptions of their work positions.

SNF management at the ISFS is part of the nuclear fuel cycle, for which relevant management documentation and subordinated operational documentation is developed:

- Operating procedures,
- Normative operating procedures,
- Technological operating procedures,
- Schedules of in-service inspections of classified equipment.

Inspections, revisions, maintenance, tests and complex care for the equipment to manage SNF are carried out according to the instructions developed overall for transport technology part and for individual systems and equipment. Obligations, responsibilities and competence of staff are set in the job descriptions. The licensee shall make records and keep data on operation of a nuclear installation that is important for decommissioning, contained in the conceptual plan for decommissioning. At the same time it is obliged to provide for special purpose funds to cover the decommissioning costs (contributions to the Nuclear Fund).

G.5.5 Technical support for operation

Organizational units of the licence holder include departments of technical support and safety, the main goal of which is, inter alia, the following:

- Supervision over compliance with the nuclear safety rules during operation and assessment of any design modifications and modes of operation with respect to nuclear safety;
- Organization of off-site and on-site radiation inspection, personal dosimetry inspection and surveillance of observance of rules of radiation safety, organization of measures for health protection of employees and citizens in the surrounding of NPP against ionizing radiation by application of ALARA principle,
- Monitoring of seismic activity,
- Improvement of safety, reliability and operational effectiveness;
- Development of operational procedures for normal and accident operation and other operational documentation and its continuous updating;

- Event analysis, elaboration of their analysis and the whole organization of feedback of own and foreign nuclear installations;
- Recordkeeping of nuclear materials, calculation of fuel loads and strategy of fuel cycle, supervision over nuclear safety during fuel exchange and physical start-up.

In ensuring the above listed tasks the licensee cooperates with external support organizations.

Research and Development

ÚJD SR has supported various research tasks under its Research & Development Program (R&D) e. g.: “Application of burnup credit (hereinafter referred to as “BUC”) in the criticality calculation of the WWER-440 fuel assemblies” in cooperation with Nuclear Power Plants Research Institute (VUJE, a. s.). The aim was to examine possibilities of the WWER-440 spent fuel storage and transport with higher original enrichment in the existing storage and transport facilities. It consists of an analysis of options for shipment and storage of spent nuclear fuel from the WWER-440 with the initial enrichment of up to 5% ²³⁵U in an existing transport container C-30 with T-12 or KZ-48 casks and in the spent fuel pools at the reactor.

We have developed a methodology for using BUC, taking into account only actinides, and validated the scale system 6.0 (or 6.1) as a tool for WWER-440 fuel. The second part of the project included fission products.

In order to have validated results three Slovak organizations (VUJE, a. s., JAVYS, a. s., ÚJD SR) have joined an international consortium focused on further investigation of nuclide composition of WWER-440 spent fuel within the framework of project ISTC #3958. ÚJD SR also developed guidelines for the application of BUC in Slovakia.

The BUC will be needed to permit a new type of fuel with an enrichment of 4.87% ²³⁵U in the pool next to the reactor and in the KZ-48 cask.

The last item is the preparation of safety reports (for transport and storage) for the new type of fuel with average enrichment of 4.87% ²³⁵U in the KZ-48 cask, applying BUC. Another R&D project focuses on determining the relationship between the generation of residual heat in spent fuel and the surface temperature of the C-30 shipping container. The generation of residual heat is calculated by special software. During the transport of spent nuclear fuel, the surface temperature of the transport container is limited. The results of this project will allow better prediction of surface temperature and residual heat release.

The project simulates real conditions during transport of spent nuclear fuel in a C-30 transport container with KZ-48 cask inside. Dummy fuel assembly in each position inside the KZ-48 cask was placed to achieve the same volume of water inside the shipping container C-30. Every second dummy assembly has an electrically heated coil. The temperature is measured inside the shipping container, as well as at selected points on the surface. The results were processed and the mathematical dependence between the known residual heat temperature and the surface temperature was calculated.

G.5.6 Analysis of Operational Events

Article 27 of the Atomic Act (Act No. 541/2004 Coll.) defines operational event categories (failures, incidents, accidents), notification obligations of the operator toward regulators, requirements for identification of causes of operational events and requirements for public information. The internal documentation, in addition to the requirements of this Act, include also IAEA and WANO expectations for the feedback from events.

Each operational event is recorded and systematically evaluated. The whole process related to the analysis of operational events, their reporting *to the UJD SR* and archiving is carried out or coordinated by designated staff in the Nuclear Safety Department.

At the meetings of commissions for operational events management (Failure Commission, Extraordinary Failure Commission), members of which are managerial staff of department of safety operation, administration and maintenance, the relevant commission approves the analysis and takes corrective measures to eliminate root causes of events so they are not recur.

As part of the proactive approach aimed at prevention of operational events occurrence, the licensees have elaborated a system of dealing with near-miss events and events without consequences. In 2004, NPP Mochovce and NPP Jaslovské Bohunice started a project in co-operation with the Comenius University called "Improvement of safe operation and safety culture by applying the near-miss event concept (NSP/03-S10)". This project has been completed in 2005 and its output brought further improvement of dealing with near-miss events and events without consequences in the mentioned power plants.

Another proactive approach is to utilize experience from operational events of other nuclear power plants, especially from the WANO and the IAEA databases. Operators have developed various procedures and criteria, under which they assess the applicability of knowledge from events at other nuclear power plants. Result of this assessment is approval of preventive measures to avoid occurrence of similar events.

The effectiveness of operational events management is annually assessed in the annual reports on operational events and reports on nuclear safety and reliability. Result of these assessments is the implementation of measures of organizational character aimed at continuous improvement of the processes of operational events feedback.

G.6 Disposal of Spent Nuclear Fuel

Article 10 of the Joint Convention

Disposal of Spent Fuel

If, pursuant to its own legislative and regulatory framework, a Contracting Party has designated spent fuel for disposal, the disposal of such spent fuel shall be in accordance with the obligations of Chapter 3 relating to the disposal of radioactive waste.

Records are kept on spent nuclear fuel management, which are preserved for future disposal and contain the following:

- a) identification data on spent nuclear fuel,
- b) history of irradiation in nuclear reactor,
- c) isotopic composition of spent nuclear fuel after its removal from nuclear reactor,
- d) placement of spent nuclear fuel,
- e) data on tightness of spent nuclear fuel cladding,
- f) data listed in the approved limits and conditions of safe operation.

Systematic development of a deep geological repository (GR) for permanent disposal of SNF and high level RAW started in 1996. In the period from 1996 to 2001, the first two parts of the initial stage of development of deep geological repository were completed, within which the following tasks were addressed:

- Design and implementation activities,
- Source term, near and distant interactions,
- Siting,
- Safety analyses,
- Public involvement.

Basic field research was carried out at 5 survey sites. In addition to that, partial reports summarised international experience in the deep geological repository development, directions and plans in all areas were set, expert teams for solution of individual issues were established, and co-operation started with organizations dealing with deep geological repository in Belgium, Switzerland, the Czech Republic and Hungary.

In 2014, within the meaning of the Council Directive (European Union) 2011/70/EURATOM establishing the (European) Community framework (for atomic energy) for the responsible and safe management of spent nuclear fuel and radioactive waste, the “Draft National Policy and the National Program for the management of spent nuclear fuel and radioactive waste in SR” was developed in Slovakia and approved in 2015 by Government Resolution No. 387/2015.

In accordance with the above-mentioned document, the Slovak Republic has opted for a so called dual track strategy for the disposal of SNF and RAW not disposable in the existing RÚ RAO Mochovce:

- Direct disposal of SNF in a deep geological repository (together with RAW not disposable in RÚ RAO Mochovce) developed in the SR; this option considered by the strategy as a priority option,
- Disposal of SNF in an international repository.

The National Programme for the development of international repositories proposes:

- Participation in activities that could lead to an international deep repository, i.e. a repository jointly owned and operated by several states based on relevant international treaties; it is expected that the economic as well as other benefits of such solution for the final stage of management of spent nuclear fuel, will ultimately outweigh the geopolitical and social barriers that are hindering the practical implementation of such a solution, depending on the development of both solutions, a decision will be taken and periodically reassessed as for which of the paths will eventually be implemented,

- by 2020 to evaluate the developments in the given area and based on this development to make a decision, whether Slovakia will continue in these activities or completely abandons the idea of deep geological repository shared with another country (countries).

At the turn of 2012/2013, activities were initiated to continue the national program for the development of the deep geological repository. The first stage of activities related to the “new” development of deep geological repository in the Slovak Republic was completed in 2016. Within this stage, the following tasks were addressed:

- Comprehensive evaluation of the work performed so far in the project of development of deep geological repository, including summary of the results achieved within the framework of international activities in the subject area and evaluation of the results in the form of a comprehensive summary document.
- Update of a document "Criteria for site selection and evaluation".
- Analysis of the possibilities of economic and non-economic instruments to support the implementation of the deep geological repository.
- Development of a strategy for public relations in the area of development of the deep repository in SR.
- Information and promotional materials on the development of the deep geological repository.
- Updated feasibility study of a deep geological repository in SR.
- Draft legislation to stimulate the affected municipalities during the implementation of survey work and after the siting of the deep geological repository.
- Detailed work plan for the period 2017 - 2023 and proposal for further development of the deep geological repository for RAW and SNF in Slovakia.
- In 2016, the project “Deep geological repository – site selection, stage 1” was completed, which also included a proposal for further development of the deep geological repository in SR.
- In the years 2017 and 2018, the deep geological repository development program continued with the project “Deep geological repository – site selection, stage 2 – Part I “
- The geological task project – pursuant to Act No. 569/2007 Coll. on geological works (the Geological Act) and Decree No. 51/2008 Coll., which implements the Geological Act, deals with the proposal for the design of relevant geological and technical works for two selected promising sites for the disposal of spent nuclear fuel and high-level radioactive waste in the SR: “Tribeč” and “Western part of Rimava basin“. The project of geological repository includes the definition of the projected geological works and methods, with an indication of the scope and method of their application. Part of the project preparation of drilling works is the analysis of possibilities and selection of potentially suitable locations for the drilling works.
- The deep geological repository is expected to be commissioned roughly around 2065.

H Safety of Radioactive Waste Management

This part relates to similar requirements of the Convention as part G, which deals with the requirements of the Convention regarding spent fuel management. Since the requirements for safety, procedures and legislation regarding spent fuel and RAW management are often identical, where appropriate, references are made to the relevant chapters in Part G.

H.1 General Safety Requirements

Article 11 of the Joint Convention

General Safety Requirements

Each Contracting Party shall take the appropriate steps to ensure that at all stages of radioactive waste management individuals, society and the environment are adequately protected against radiological and other hazards.

In so doing, each Contracting Party shall take the appropriate steps to

- i) ensure that criticality and removal of residual heat generated during radioactive waste management are adequately addressed;*
- ii) ensure that the generation of radioactive waste is kept to the minimum practicable;*
- iii) take into account interdependencies among the different steps in radioactive waste management;*
- iv) provide for effective protection of individuals, society and environment, by applying at the national level suitable protective methods as approved by the regulatory body, in the framework of its national legislation, which has due regard to internationally endorsed criteria and standards;*
- v) take into account the biological, chemical and other hazards that may be associated with radioactive waste management;*
- vi) strive to avoid actions that impose reasonably predictable impacts on future generations greater than those permitted for the current generation;*
- vii) aim to avoid imposing undue burdens on future generations.*

General safety requirements of RAW management are similar as by SNF and are described in the chapter G.1.

The licensee is responsible for ensuring safe management of RAW in accordance with the national program up to the point of their taking over to the repository.

RAW shall be managed so as to:

- a) maintain sub-criticality,
- b) secure residual heat removal,
- c) minimize the effects of ionizing radiation on *workers*, the population and the environment,
- d) take into account the properties that influence nuclear safety, such as toxicity, flammability, explosiveness and other hazardous properties.

Radioactive waste generation and radioactive waste management shall follow technical and organizational measures so that their amounts and activity are kept as low as reasonably achievable.

The conditioning of radioactive waste consists of activities leading to production of a form suitable for its transport and disposal or for its storage.

All RAW management activities must be directed towards the safe disposal of RAW.

For RAW inventory see Annex V.

H.1.1 RAW Generation Minimization Program

Every licensee shall spend all efforts to minimize RAW generation. The requirement for minimization of RAW generation is laid down in the Atomic Act (No. 541/2004 Coll.). Act No. 87/2018 Coll. on radiation protection imposes an obligation on the licensee to limit the production of RAW to the necessary extent. The minimization system is elaborated at every nuclear installation in line with legislative requirements. Fulfilment of programs for RAW generation minimization is controlled annually in the "Report on RAW Management". This report proposes new measures to minimize RAW generation for the next period and evaluates their fulfilment.

For radioactive materials containing radioactive nuclides below the *release level*, a "Draft procedure for measuring low contaminated materials from the operation of NPP V1, V2 and their release into the environment" and "Methodology for releasing low contaminated waste from operation of NPP V1, V2 into the environment" were developed. Authorization for release of RA-materials into environment was issued in 2010 by the ÚVZ SR for the locality of Jaslovské Bohunice and in 2016 for Mochovce site.

H.1.2 Connections between stages of RAW management

In 2003, the "Type catalogue of radioactive waste and their treatment and conditioning" was issued for NIs in SR. This document is regularly updated, usually at two-year intervals, or according to current requirements. The last update of this operating regulation entitled "Type catalogue of radioactive waste" was in 2019. This document provides basic information for the correct identification and categorization of RAW during their packaging and transfer or acceptance for treatment and conditioning in the relevant technological facilities. The document also defines principles and conditions for RAW acceptance to be treated and conditioned so as to meet the requirements for creating a product during the treatment and conditioning of these RAW, which would comply with criteria for permanent disposal in RÚ RAO Mochovce and would not endanger safety operating personnel during any further manipulations of RAW including transports. The criteria of acceptance are included in Limits and Conditions of the relevant installation.

Part of the document "Plan of radioactive waste and spent nuclear fuel management including their transport", which is submitted by the licence holder and reviewed by the ÚJD SR prior to construction and operation of RAW management facilities, are also descriptions and analyses of RAW streams containing the following activities:

- Storage of untreated RAW;
- RAW treatment,
- Storage of intermediate products,
- Shipment between individual steps,
- RAW conditioning.

Prior to starting the RAW management itself, it is necessary to characterize the physical and chemical and radiochemical properties of a specific type of RAW, stated on the accompanying sheet of RAW in the packaging (required by the ÚJD SR Decree No.30/2012). The accompanying sheet is handed over together with RAW at individual stages of activities relating to RAW management.

Safety requirements on particular activities are listed in the ÚJD SR Decree No. 30/2012.

Before commissioning and during operation, operational procedures, which take into account relations between individual steps of RAW management, are elaborated and improved. The devolving of RAW within JAVYS, a. s. between the producer of RAW and JAVYS, a. s. is subject to by operational procedures and is contractually covered.

H.1.3 Assurance of Effective Protection of Individuals, Society and the Environment

For description see G.1.

H.1.4 Biological, chemical and other risks

For description see G.1.

H.1.5 Limiting Impact on Future Generations and their inadequate burdening

For description see G.1.

H.2 Existing Facilities and Past Practices, Revision of Safety Assessment

Article 12 of the Joint Convention

Existing facilities and past practices

Each Contracting Party shall in due course take the appropriate steps to review

- i) The safety of any radioactive waste management facility existing at the time the Convention enters into force for that Contracting Party and to ensure that, if necessary, all reasonably practicable improvements are made to upgrade the safety of such a facility;*
- ii) The results of past practices in order to determine whether any intervention is needed for reasons of radiation protection, bearing in mind that the reduction in detriment resulting from the reduction in dose should be sufficient to justify the harm and the costs, including the social costs, of the intervention.*

For description see G.1.1.

The RAW management facilities when commissioned complied with the safety requirements laid down in the valid legislation. They were gradually harmonized with the increased requirements according to the legislative conditions (see Annex VII., Table 1.). The Czechoslovak Atomic Energy Commission (ČSKAE) Decree No. 67/1987 Coll., which laid down safety requirements for RAW storage, has allowed their implementation within five years. The ÚJD SR Decree No. 190/2000 Coll. has required an accompanying sheet of RAW and consistent recordkeeping of RAW. The records in electronic form for

RAW occurred before 2000 has been gradually completed based on partial written background documents, or in case of “the historical waste”, they were removed, sorted and categorized according to the requirements on the accompanying sheet of RAW. At present, ÚJD SR Decree No. 30/2012 Coll. applies for the field of RAW and SNF management.

H.3 Siting of Proposed Facilities

Article 13 of the Joint Convention

Siting of Proposed Facilities

1. *Each Contracting Party shall take the appropriate steps to ensure that procedures are established and implemented for a proposed radioactive waste management facility*
 - i) *To evaluate all relevant site-related factors likely to affect the safety of such a facility during its operating lifetime as well as that of a disposal facility after closure;*
 - ii) *To evaluate the likely safety impact of such a facility on individuals, society and the environment, taking into account possible evolution of the site conditions of disposal facilities after closure;*
 - iii) *To make information on the safety of such a facility available to members of the public;*
 - iv) *To consult the Contracting Parties in the vicinity of such facility, insofar as they are likely to be affected by that facility, and provide them, upon their request, with general data relating to the facility to enable them to evaluate the likely safety impact of the facility upon their territory.*
2. *In so doing, each Contracting Party shall take the appropriate steps to ensure that such facilities shall not have unacceptable effects on other Contracting Parties by being sited in accordance with the general safety requirements of Article 11.*

H.3.1 Legislative requirements

For description see G.2.1.

H.3.2 Siting of Particular NIs

A nuclear installation (NI) is, according to the Atomic Act, a set of civil structures and necessary technological equipment in the configuration defined by the design, intended for:

- *Electricity production or research in the field of nuclear energy, part of which is a nuclear reactor or nuclear reactors, which will use, are using or have used fission chain reaction;*
- *Management of nuclear materials with a quantity greater than one effective kilogram, except for storage areas for containers and shelters, where nuclear material is used as shielding material for radioactive sources, uranium ore processing facilities and uranium concentrate storage facilities*
- *SNF management*
- *RAW management*
- *Uranium enrichment or nuclear fuel production.*

The decision to issue approval of the siting of nuclear facilities is taken by the ÚJD SR, based on written application supported by the documentation listed in Annex 1, (A) of Act No. 541/2004 Coll., and based on a statement by the European Commission in accordance with the international treaty, by which the Slovak Republic is bound.

In order to assess the impact of a nuclear facility on the environment, as well as the potential impact of the surrounding environment on the nuclear facility, again the ÚJD SR issues an opinion based on an application supported by the documentation listed in Annex 1 (A).

The criteria for site selection for the siting of nuclear facilities are specified and defined in the legislation and relevant IAEA safety standards. In proposing the NI siting of currently operating, under construction or in decommissioning in the SR, the applicable legislative requirements and conditions in force at the relevant time, have been respected.

As part of the approval processes for siting NIs, or changes to the NI, the impact of the proposed activity on the environment and the assessment of the influencing factors was assessed in accordance with Act No. 24/2006 Coll. on environmental impact assessment. In case the proposed change needs to be assessed, EIA process is implemented, which is completed when the Final Opinion of the MŽP SR is issued, together with the recommended alternative for implementation.

H.4 Design and Construction of Facilities

Article 14 of the Joint Convention

Design and Construction of Facilities

Each Contracting Party shall take the appropriate steps to ensure that

- i) The design and construction of a radioactive waste management facility provide for suitable measures to limit possible radiological impact on individuals, society and the environment, including those from discharges or uncontrolled releases;*
- ii) At the design stage, conceptual plans, and if necessary, technical provisions for the decommissioning of a radioactive waste management facility other than disposal facility are taken into account;*
- iii) At the design stage, technical provisions for the closure of a disposal facility are prepared;*
- iv) The technologies incorporated in the design and construction of a radioactive waste management facility are supported by experience, testing or analysis.*

Legislative requirements and procedures for the design and construction of facilities for RAW management are defined in Decrees No. 430/2011 Coll. and No. 30/2012 Coll. The requirements for the issuance of a building permit is as described in Section E.2 and contained in the Building Act (Act No. 50/1976 Coll.), and the Atomic Act (Act No. 541/2004 Coll.). ÚJD SR decides about issuing a building permit for the construction of a nuclear facility based on a written application for a building permit supported by the documentation as specified by the Building Act.

The documentation required for the issuance of a building permit for the construction of the RAW management facility includes a preliminary safety report that demonstrates compliance with the statutory nuclear safety requirements based on the data considered in the design.

In accordance with the ÚJD SR Decree No. 58/2006 Coll. laying down the details on the scope, content and method of preparation of documentation of nuclear facilities is that the Preliminary Safety Report Contains plans for the decommissioning of the given nuclear facilities individual decisions, This report is submitted to the Authority as a first-level conceptual document in the hierarchy of decommissioning plans together with the request for approval of the siting of the nuclear facility. The design of a nuclear

facility must, through design features, take account of planned decommissioning and take into account expected levels of contamination and activation of the nuclear facility at the end of the service life.

Between 2022 and 2024, a project was implemented at NPP A1 for the construction of a workplace for the management of large-scale materials from the decommissioning of NPP A1, the aim of which is to enable their further treatment and conditioning at the TSÚ RAO. Other projects related to the preparation for Phase V of NPP A1 decommissioning, the reconstruction of the carbon sewage system for collection, storage and pumping of liquid RAW and the reconstruction of the HVAC system in the main production unit of NPP A1 were also carried out.

In TSÚ RAO the following investment projects were implemented: "Optimization of RAW incineration capacity", which was put into operation by the Authority's Decision in 2018, and "Facility for melting metallic RAW" at the Jaslovské Bohunice site, which has been in operation since 2021. In 2022, the project "Modification on the drainage of contaminated waters from the ISFS" was completed, the aim of which was to ensure modification of systems necessary for the decommissioning of NPP V1, and at the same time to disconnect the ISFS and its safe connection to the TSÚ RAO systems.

The specific requirements for the design of the repository are in addition to the general requirements for nuclear safety of nuclear installations in their design and, specifically for this type of nuclear installation, require, among other things, the preparation of a preliminary design for the solution of its overlay and the method of closure of the repository.

The project takes into account the inventory and properties of disposed RAW and include a technical solution for adequate isolation of RAW from the environment not only during operation, but also after closure during the institutional control of the repository within the specified duration of its active and passive part. It must be ensured that the design will provide a multi-barrier containment system, through an appropriate combination of engineered features and natural site features, to achieve long-term post-closure safety. It is required that the safety of the repository over its design life is preferably achieved by passive features, including a gravity drainage system, and that the need for active post-closure activities is minimised.

Pursuant to the ÚJD SR Decree No. 30/2012, the characteristic properties of the repository, in particular the ingress of water into the repository and the release of radioactive materials into the environment, are monitored throughout the commissioning, operation, as well as in the period of institutional control after its closure. However, it must be ensured that the monitoring system does not reduce the tightness of the repository.

The requirements for the technologies used in the design and construction of the RAW management facility are defined in the Atomic Act (Act No. 541/2004 Coll.), in the ÚJD SR Decree No. 430/2011, and in the ÚJD SR Decree No. 30/2012. Civil structures, technological sets and equipment relevant to nuclear safety and operational reliability of equipment for RAW management shall be designed, manufactured, installed and tested so as to ensure their reliable function. Manufacturers and suppliers of safety related equipment, their materials and equipment are obliged to state in the documentation on the quality of the delivery, the results of selected quality checks at the manufacturer and tests of

properties of elements, equipment, base material, welded joints and weld-on, properties and material composition and the findings and eliminated defects identified by inspection. In cases where special technological procedures may affect the resulting properties of the materials and products used, further testing must be ensured in advance (e. g. keeping of test specimens). Systems, structures and components shall be designed according to the relevant technical standards, their selection meets the reliability objectives of a facility for radioactive waste management in terms of nuclear safety and the design was verified in similar previous applications. The design of such facility takes into account operational experience and available results from research programs from similar nuclear facilities. During the construction of facilities for radioactive waste management, it is necessary to ensure the compliance check of installed systems, structures, components or their parts with the design documentation and the quality assurance requirements, records are made and maintained on the checks performed.

In accordance with the above requirements, documentation for the building permit for the construction of the 4th double row of storage boxes for the disposal of low-level radioactive waste in the RU RAO Mochovce was prepared and approved by UJD SR with the deadline for completion in 2025..

H.5 Safety Assessment of Facilities

Article 15 of the Joint Convention

Safety Assessment of Facilities

Each Contracting Party shall take the appropriate steps to ensure that

- i) Before construction of a radioactive waste management facility, a systematic safety assessment and an environmental assessment appropriate to the hazard presented by the facility and covering its operating lifetime shall be carried out;*
- ii) In addition, before construction of a disposal facility, a systematic safety assessment and an environmental assessment for the period following the closure shall be carried out and the results evaluated against the criteria established by the regulatory body;*
- iii) Before the operation of a radioactive waste management facility, updated and detailed versions of the safety assessment and an environmental assessment shall be prepared when deemed necessary to complement the assessment referred to in paragraph i).*

The documentation for the commissioning and operation of a nuclear installation must include a pre-operational safety report which specifies the preliminary safety report.

The Pre-operational Safety Report (hereinafter referred to as "PoSAR") focuses on the introduction of modifications to the design-basis, demonstrating the maintenance of its safety and on additional calculations and measurements resulting from the requirements of the Preliminary safety report. In addition to the description of RAW and SNF management process, the PoSAR also includes a detailed description of safety functions of all safety systems, structures, systems and components with an impact on nuclear safety, and safety analyses verified by an independent entity. The report sets out the limits and conditions for safe operation and the procedure for commissioning of a nuclear installation. A description of the operation of facilities and technologies for RAW and SNF management in a nuclear facility, together with their safety analyses, is also included in the plan for RAW and SNF management, which is also part of the documentation for commissioning of a nuclear installation.

Envelope safety analyses are included in the decommissioning plan for the decommissioning of NPP V1. Due to the fact that the power plant is decommissioned step by step, the ÚJD SR requires specific safety analysis for each decommissioning project, as the projects are implemented by public procurement.

As part of the safety analyses for stage 3 and 4 of decommissioning of NPP A1, the activities of historical RAW management carried out in parallel to the decommissioning were also assessed. The scope of the safety analyses has been determined with regard to the purpose and level of permitting documentation prepared to such an extent as to illustrate that the activities performed are manageable in a safe manner with have impact on workers, as well as the population, and do not exceed statutory limits. Before carrying out the decommissioning activities of stage 3 and 4, detailed work programs or operating procedures have been developed for the RAW treatment lines, which already include specific safety analyses, including the proposal of preventive or elimination measures.

To help the preparation of safety analyses, the ÚJD SR issued a safety guide "Requirements of safety analyses of activities performed during decommissioning of nuclear installations."

The independent assessment of safety analyses by a third party that is not directly involved in the development of safety analyses significantly contributes to building confidence.

In the safety analyses, in addition to radiation risks (e.g. external exposure, internal exposure by inhalation or ingestion or internal exposure caused by injury and subsequent wound contamination), other risks associated with chemical and toxic materials, should be considered in safety assessment. In addition, other significant risks in the process of decommissioning of nuclear facilities are considered e. g. risks in places where dismantling and demolition activities are carried out or where transport of heavy loads takes place, heavy equipment is used, etc. The stated non-radiation risks are mentioned directly in the safety guide only if they lead or may affect the occurrence of radiation risk.

The results of safety analyses serve as a basis for demonstrating compliance with safety requirements or to define safety measures needed to comply with these requirements, as well as to demonstrate the application of the ALARA principle. Uncertainties and assumptions associated with the developed safety analyses need to be identified, documented and updated as necessary.

Safety analyses for decommissioning must clearly demonstrate that the safety measures implemented are robust enough to ensure the required level of safety during the planned decommissioning activities, as well as during operational events.

Safety analyses for decommissioning need to be updated, or more extensive revisions must be performed in the event of any significant change that affect safety or related arguments regarding the level of safety. These changes include, e.g. major modifications to the equipment, modifications to procedures, new information obtained during decommissioning activities (e.g. finding that assumptions or data relevant to safety assessment were inaccurate or incorrect or demonstrating the presence of hazardous substances not considered in the original analysis).

As required by the Decree, the licence holder must check the readiness of the nuclear installation for operation prior to the start of operation and verify and record the compliance of the licensing documentation, including the preliminary safety report, with the current status of the nuclear installation.

In accordance with the Atomic Act, it is necessary to increase nuclear safety to the highest practically achievable level during operation and during decommissioning and to perform periodic, comprehensive and systematic nuclear safety review at least every 10 years and at the end of the decommissioning stage, taking into account the current state of knowledge in the field of nuclear safety review, and to adopt measures to eliminate the identified deficiencies and to prevent their recurrence in the future.

The safety review of nuclear installations during operation is carried out in accordance with the Authority's Decree No. 33/2012 Coll. Periodic review during decommissioning is focused mainly on the comparison of achieved status of decommissioning with the defined final state of the facility in the given stage of decommissioning, and the requirements of the ÚJD SR Decree No. 33/2012 Coll. apply accordingly (see chapter G.).

EIA is considered to be one of the main tools of international environmental policy for the implementation of sustainable development. In general, the environmental impact assessment process (EIA process) pursuant to Act No. 24/2006 Coll. on environmental impact assessment precedes the permitting of activities with a significant impact on the environment, i.e. the result of the EIA process - the final opinion - is binding for further authorisation of the activity. RAW management facilities, pursuant to Annex 8 of Act No. 24/2006 coll. on environmental impact assessment, are subject to mandatory assessment, whereas, due to the nature of the activity, the construction of facilities for the RAW management is also assessed on a transboundary basis. The Final Opinion of the MŽP SR recommending implementation of the proposed activity, i.e. construction of a facility for RAW management, forms part of the documentation needed for the building permit. In its decision, the authorising authority must take into account the outputs of the environmental impact assessment process as set out in the Final Opinion.

The construction of a repository, like any other nuclear installation, is, according to Act No. 541/2004 Coll. (Atomic Act), subject to the issuance of an authorisation and the submission of the relevant documentation. This package also includes a preliminary safety report containing a systematic safety assessment.

Pursuant to the ÚJD SR Decree No. 30/2012, safety analyses of a repository represent a comprehensive assessment of the risks associated with RAW disposal and demonstration of the functionality and safety of the entire disposal system in terms of its potential impacts on humans and the environment, taking into account the natural evolution of the repository, as well as the potential for its disruption after the termination of disposal and its closure. The safety analyses also include uncertainty analyses and sensitivity analyses of the results to individual parameters. The safety analyses shall also take into account the period of institutional control after closure of the repository. The safety assessment shall be based on the dose limit values established for the relevant scenarios by the radiation protection supervisory authority.

In accordance with the ÚJD SR Decree No. 430/2011 Coll., the design of a nuclear installation must respect and comply with the principles and requirements for ensuring radiation protection of employees, the public and the environment and their continuous and emergency monitoring. Installations in contact with radioactive substances must be designed, located, shielded and operated in such a way that the

risk of exposure of persons in the nuclear installation under all operating conditions is as low as reasonably achievable, taking into account technical, economic and societal factors, and that the exposure is lower than the limits laid down by Act No 87/2018 Coll. on Radiation Protection. The design must include engineering safety measures and procedures to control and mitigate potential radiological consequences. It must ensure that operational conditions that may result in high radiation doses or the release of radioactive substances, have a very low frequency of occurrence and operational conditions with a significant frequency of occurrence have only negligible or no potential radiological consequences. The design shall be made to include appropriate means of warning the public and notifying persons within the nuclear installation and within the emergency planning zone during incidents and accidents, and shall include clearly marked escape routes with emergency lighting, ventilation and other systems and equipment necessary for the safe use of these routes.

JAVYS, a. s. as the licensee, after completion of stage III and IV of the decommissioning of NPP A1 its transition to stage V. Completion of the current stage is planned for the end of 2024. For the licensee, this means that at the end of the decommissioning phase, it is obliged to carry out a periodic nuclear safety review comparing what has actually been achieved with what should have been achieved, or was planned to be achieved, at the end of the current phase. The reference date for the periodic safety review for NPP A1 was 31 December 2023. This process is followed by the application for the NPP A1 stage V decommissioning licence.

H.6 Operation of Facilities

Article 16 of the Joint Convention

Operation of Facilities

Each Contracting Party shall take the appropriate steps to ensure that

- i) The licence to operate a radioactive waste management facility is based upon appropriate assessments, as specified in Article 15, and is conditional on the completion of a commissioning program demonstrating that the facility, as constructed, is consistent with design and safety requirements;*
- ii) operational limits and conditions, derived from tests, operational experience and the assessments as specified in Article 15, are defined and revised as necessary;*
- iii) operation, maintenance, monitoring, inspection and testing of a radioactive waste management facility are conducted in accordance with established procedures. For a disposal facility the results thus obtained shall be used to verify and to review the validity of assumptions made and to update the assessments as specified in Article 15, for the period after closure;*
- iv) engineering and technical support in all safety-related fields are available throughout the operating lifetime of a radioactive waste management facility;*
- v) procedures for characterization and segregation of radioactive waste are applied;*
- vi) incidents significant to safety are reported in a timely manner by the holder of the licence to the regulatory body;*
- vii) programs to collect and analyse relevant operating experience are established and that the results are acted upon, where appropriate;*
- viii) decommissioning plans for a radioactive waste management facility other than a disposal facility are prepared and updated, as necessary, using information obtained during the operating lifetime of that facility and are reviewed by the regulatory body;*
- ix) plans for the closure of a disposal facility are prepared and updated, as necessary, using information obtained during the operating lifetime of that facility and are reviewed by the regulatory body.*

H.6.1 Commissioning and Operation of Facilities

Authorization for commissioning of nuclear installation and operation of nuclear installation is issued by ÚJD SR in compliance with the Atomic Act (Act No. 541/2004 Coll.) – see G.5.1, G.5.2.

According to the Atomic Act (No. 541/2004 Coll.) the operation of a nuclear facility is divided into trial operation and operation. After assessment of the report on evaluation of the preceding stage of nuclear installation commissioning, ÚJD SR issues an approval for the next stage of commissioning based on the application of the licensee.

Approval for trial operation shall be granted by the Authority upon submission of a written application accompanied by a report on the evaluation of the commissioning of the nuclear installation. This approval shall form part of the approval for the temporary use of the structure for test operation pursuant to a special regulation. Following a positive evaluation of the trial operation, the Authority shall, at the proposal of the licence holder, initiate the final approval procedure in accordance with the Building Act.

The issuance of a licence for operation is subject to submission of a report on evaluation of the nuclear installation commissioning stage and of a record of preparedness of the nuclear installation and of the employees for continuous operation.

All RAW management facilities have a valid licence of ÚJD SR for their operation issued under the above mentioned conditions.

H.6.2 Limits and Conditions for RAW Management

For all nuclear facilities in the SR, there are limits and conditions (L&Cs), the format and content of which follows the IAEA guides SSG-40, WS-G-6.1 and of the United States Nuclear Regulatory Commission (US NRC). The following is stated for each limit condition:

- objective of the limit condition,
- text of the limit condition,
- validity of the limit condition (to which regime of JZ it applies),
- activity of operational personnel in case the limit condition is not met,
- requirements on inspection – they determine frequency, type and scope of inspections and tests of systems and equipment.

The fulfilment of Limits and Conditions is continuously monitored by the maintenance staff and by technical support personnel.

In the event of a need to modify the L&Cs, an amendment to the regulation is drawn up with the relevant justification, and the change comes into force only after approval by the regulatory authority.

Departments of nuclear safety of the licensee elaborate periodically, quarterly and annually, a report on nuclear safety, which is submitted to the management. The report includes also evaluation of the whole area of L&C. The number of changes to L&Cs, the period of unavailability of safety systems and eventual violation of L&Cs serve as indicators.

H.6.3 Working procedures

The RAW management system is elaborated in detail in the process and operational documentation so as to ensure compliance with the requirements of Decree No.. 30/2012 and ÚJD SR Decree No. 57/2006.

Procedures, principles and instructions for operational documentation processing is described in detail in relevant directives and guidelines of the quality assurance system. Every operational document passes through annotation and approval process in particular concerned departments and at the end, it is approved by the top management of the organization. The same procedure also governs the process of changes and amendments of individual documents of the used documentation:

- Operational documentation
- Documentation of inspections and testing of equipment
- Technological and working procedures for maintenance.

Results obtained during activities are reflected into modifications of such procedures as well as to modifications in Limits and Conditions.

H.6.4 Engineering and technical support

See G.5.5 for description

H.6.5 Waste characterisation and sorting procedures

The "Type catalogue of radioactive waste" provides basic information for the labelling and categorization of RAW for their packaging and hand-over or take-over for treatment in the treatment facilities (see H.1.2).

H.6.6 Reporting of events to the regulatory body

The system of reporting events to the regulatory body is the same for all nuclear installations (see G.5.6).

H.6.7 Conceptual Decommissioning Plans

Conceptual decommissioning plans are included in the documentation submitted prior to the commissioning of a nuclear installation and they specify preliminary conceptual decommissioning plans (see chapters G.3, H.4). Conceptual decommissioning plans document the presumed conditions after operation termination and contain goals and procedure of decommissioning including financial demands estimation, description of presumed radiation situation and amounts and activities of radioactive waste; they state requirements on capacity of installations for radioactive waste management and requirements on gathering and record keeping of data important for planning of decommissioning.

In accordance with the requirements of UJD SR Decree No 58/2006, the Conceptual Decommissioning Plans are updated by the licence holders in response to changes at the nuclear installation or changes at the site, advances in technology, changes in generally binding legislation and the National

Programme for the Implementation of the National Policy, events, changes in the method of financing and current radiological conditions.

In 2021, conceptual decommissioning plans for JAVYS nuclear facilities intended for RAW and SNF management, namely FS KRAO, TSU RAO, IS RAO and ISFS, were updated. The reason for the update was to clarify the determination of the costs of shutdown and decommissioning of non-reactor nuclear installations.

H.6.8 Plans for repository closure

Act No. 541/2004 Coll. defines the closure of a repository as administrative and technical steps after disposal of RAW or spent fuel to the repository has been terminated, including the final construction or other work necessary to bring the repository into a long-term safe condition. The authorisation for the closure of the repository and institutional control is issued by ÚJD SR upon submission of a written application by the licence holder for operation of a repository, supported by the required documentation. The licence holder shall take measures to ensure that records are kept after the closure of a repository, institutional control is carried out and corrective intervention is taken, if necessary, in the event of an unplanned release of radioactive material (Section 22 of the Atomic Act). The specific scope of these records and the extent of institutional control shall be determined by the Authority in the conditions of the permit. The documentation required for the application for an authorisation to close the repository, according to Annex 1 to the Atomic Act, shall include, inter alia:

- Overall assessment of the state of the repository and its operation, including a description of changes and modifications and their safety assessment.
- Total inventory of disposed RAW.
- Plan for repository closure and institutional control, including safety analyses.
- Monitoring Programme including suggestions for possible measures.

Preliminary proposal of the method of repository closure, in particular its stabilization, overlay and building of a drainage system of the overlay is part of the PoSAR for National RAW Repository in Mochovce.

This repository closure and institutional control plan is based on safety analyses, and contains:

- a) Materials, technologies and procedures used to fill the interspaces of disposal boxes, to stabilize disposed packaged forms of RAW, and to ensure the final configuration of the disposal system, including the composition of the overlay and the design of the drainage system in order to maintain long-term life of the repository,
- b) a program for the decontamination and dismantling of unnecessary buildings and above-ground spaces, including the removal or sealing of redundant components, equipment, monitoring tunnels, shafts and boreholes or other engineering elements that could form a pathway for radionuclide leakage in the future,
- c) A description and method of RAW management generated during activities mentioned under (b),
- d) maintenance and repairs plan for individual components of the repository during the period of active part of the institutional control,

- e) Scope of activities performed during passive part of institutional control of the repository,
- f) the method of long-term storage and transfer of information, specifying the media used, as well as data relevant for taking corrective action or for reviewing the safety of the repository in the future,
- g) Detailed safety analyses of the long-term safety of the repository in the post-operation stage in connection with current data and verified by an independent organization.

To reduce the likelihood of intrusion into the repository, there are considerations to build an object that will warn about the existence of a repository in the long run.

The final overlay of the repository addresses numerous security measures for the repository and its integration into the surrounding landscape. The solution under consideration is conditioned by current knowledge, technological possibilities, as well as the design of the repository itself, and geological conditions.

The actual final overlay of the disposed waste *is planned in two* stages. The first *stage* is characterized by the construction of a water-proof concrete monolithic slab above the double-rows. After the completion of disposal in the premises and full implementation of the first stage of overlay *of all filled double-rows*, operational facilities, unnecessary utility networks, fencing of the premises, unnecessary roads will be gradually removed, and stage 2 of the final covering will be implemented, but it will be necessary to ensure access road to the new part of the repository for inspections, development of warning and information system and possibly to make maintenance. In the period after the end of inspections, the fencing will be removed, the inspection shafts and sampling points will be made inaccessible. The access road will be no longer purposeful and it will be possible to liquidate it, if it is not liquidated earlier due to the development of means of transport. Given the development of technology and the new requirements that will arise during the period of institutional control, it is currently difficult to estimate the needs and how to address them.

Requirements for the repository design:

- Development of a multi-barrier system,
- Gravity drainage of drainage systems,
- Creation of conditions for capture and drainage of surface water from the surrounding sloping surfaces or prevention of water inflow into the repository area and drainage of the repository,
- Ensuring access and fencing during institutional control, allowing sampling, including the location of any damage to the barriers,
- Prevention of unauthorized access to the drainage system or tunnels,
- Long-term designation of the repository area,
- Integration of the final landscaping of the repository into the surrounding landscape,
- Ensuring the maximum possible service life and minimizing maintenance,
- Optimization or minimization of the scope of work in designing the final overlay,
- Urbanistic design.

In accordance with the ÚJD SR Decision No. 153/2021, a hall was moved above the VLLW disposal area to protect against weather conditions during VLLW disposal, and after its relocation, the first part of the final overlay was installed above the filled rows of the disposed VLLW (see Chapter 2.7).

The implementation of the overlay of the disposed VLLW to prevent the dispersion of radioactive substances into the surrounding environment consists in the overlay of protective layers consisting of a levelling layer of soil, a layer of clay, insulating layers, a gravel layer with upper drainage and a waterproof overlay of protective geotextile fabric.

Further, prior to moving the hall, the exposed portion of the VLLW in the operational disposal row will be temporarily covered from the top edge of the waste to the side wall of the shed with PVC tarps along the entire height. Subsequent to the implementation of these measures, the relocation of the shed roofing will take place. Following the relocation of the shed, 0,60 m of soil will be placed on top of the VLLW overlay. To check the tightness and integrity of the tarp, a SENSOR control monitoring system is designed/installed in the overlay composition, between the insulations, and led to a monitoring box located in the storage area. From the monitoring box it is possible to check the integrity of the tarp at given intervals.

Of the entire module, the drainage and drainage overlay layers for the rainwater drainage will be inspected, removal of paved areas and placing the perimeter gutter in pipe, in places of passage, possible repair of gutters, levelling layer of coarse gravel thickness of 0.30 m and a layer of soil with vegetation thickness of 0.30 m. Maintenance of this overlay should be minimal. The watertight nature of the overlay reduces the average amount of water seepage, which is a critical factor in assessing the radiological impact of the disposal system. The average seepage rate through the overlay will be determined at the end of the closure phase of the repository, prior to the start of the institutional control phase. These characteristics will be assessed in the safety analyses.

In 2024, the shed is similarly planned to be moved from the third filled row of VLLW over the fourth row, and after its relocation, the first part of the final overlay is similarly planned to be installed over the filled third row of VLLW.

The last stage of the operation of the RU RAO will be its final overlay (to be implemented after the full completion of disposal at the site, i.e. in the second half of this century). The final overlay of the entire site will be the subject of a separate project and its most important part will be a layer of compacted clay with high water-impermeable qualities - the sealing layer. It is expected that a "permanent marker" will be erected on the site, which should be a structure drawing attention to the fact that radioactive waste has been deposited on the site. This stage will be followed by institutional control of the repository, i.e. subsequent monitoring of the repository environment and prevention of access and any activities on the covered area.

H.7 Institutional Measures after Repository Closure

Article 17 of the Joint Convention

Institutional Measures after Closure

Each Contracting Party shall take the appropriate steps to ensure that after closure of a disposal facility

- i) Records of the location, design and inventory of that facility required by the regulatory body are preserved;*
- ii) Active or passive institutional controls, such as monitoring or access restrictions are carried out, if required; and*
- iii) if, during any period of active institutional control, an unplanned release of radioactive materials into the environment is*

detected, intervention measures are implemented, if necessary.

All the above-mentioned measures are described in the PoSAR for the RÚ RAO Mochovce. These measures will be elaborated in detail well before the completion of operation.

H.7.1 Keeping of documentation

All information on disposed radioactive waste including the placement of containers, amount and activity of radioactive waste, their property specifications, composition of particular package forms, during operation, is kept in compliance with licensee's procedures. The scope of records kept after repository closure *will be specified by the ÚJD SR* in the conditions of the authorisation for repository closure.

The whole documentation about the repository and the disposed waste after the end of operation shall be handed over to an entity designated by the State, which will carry out post-operational monitoring and will be responsible for preventing access to the premises. It is not possible to determine now, when this activity will be completed. After its completion, the entity will keep the documentation until the expiration of periods for keeping documents and then prepare decommissioning procedure. Registry records with permanent documentary value (archival documents) will be placed in the Slovak National Archive.

A plan of repository closure and institutional control as one of the basic documents required for the issuance of ÚJD SR authorization for repository closure contains besides others also a method of long-term keeping and transmission of information with identification of used media, as well as data important for implementation of corrective actions or for reassessment of safety of the repository in the future and a method of keeping records about results of inspections, measurements and monitoring during institutional control.

H.7.2 Institutional control

Institutional control refers to all activities carried out after the completion of RAO disposal and the construction of the final repository overlay. Necessary maintenance of the repository will be ensured and the physical protection system of the repository will be in operation. Monitoring systems will be in place to provide information on possible water ingress into the repository and its subsequent migration.

The exact scope of institutional control shall be determined based on safety analyses conducted before repository closure.

Based on the results of safety analysis and in accordance with recommendations of the WATRP Mission (Waste Management Assessment and Technical Review Programme) the 300 years duration of institutional control is assumed for the Mochovce repository and for intruder scenarios the overlay (final cover) will prevent the access to disposed RAW for a period of 500 years.

Also part of the repository closure and institutional control plan is the plan for maintenance and repair of the respective components of the repository over the period of active part of institutional control, as well as establishing the scope of activities to be carried out within passive part of institutional control of the repository.

The current safety report documents that during operation, as well as during the period of institutional control, individuals, society and the environment are protected from radiation events. PoSAR guarantees that the criteria set out for the RU RAO by the MZ SR will not be exceeded as long as the limits set forth therein are complied with:

1. Effective dose to a member of the public due to the evolution scenario shall not exceed 0.1 mSv/y in any year following the completion of institutional control of the repository;
2. Effective dose to a member of the public due to an intrusion activity (scenarios where a probability will substantially be less than 1) shall not exceed 1 mSv/y in any year following the completion of institutional control of the repository.

The documentation contains the following sections dealing with safety assessment for periods subsequent to the repository closure:

- a) Repository closure and institutional control plan (at the level of design study)
 - Stabilisation of the site,
 - Completion of repository operation,
 - Post-operation monitoring
- a) Safety analyses
 - b) Characteristics of disposed waste,
 - c) Safety aspects of repository operation,
 - d) Long-term stability,
 - e) Long-term repository safety analyses,
 - f) Waste acceptance criteria for disposal resulting safety analyses

The Mochovce RU RAO's long-term safety analyses envisaged two groups of scenarios - evolution and intrusion scenarios.

H.7.3 Intervention Measures

It is assumed that intervention measures will be performed in the case of detection of unplanned release of radioactive materials in drainage system of the repository or in some part of the environment in the vicinity of the repository, if any. Pursuant to the Atomic Act, the licensee for repository closure and institutional control will provide for such corrective intervention. The scope of corrective action is not established precisely as yet, depending on the results of controls and measurements carried out during the institutional control, on the results of the program for monitoring the state of repository barriers and the radiological monitoring plan. Afore-mentioned controls, measurements, monitoring programs are designed so as to cover all potential pathways for leakage and spread of radionuclides from the repository into the environment.

I Transboundary Movement of Spent Nuclear Fuel and Radioactive Waste

Article 27 of the Joint Convention

Transboundary Movements

1. *Each Contracting Party involved in transboundary movement shall take the appropriate steps to ensure that such movement is undertaken in a manner consistent with the provisions of this Convention and relevant international binding instruments. In so doing*
 - i) *A Contracting Party, which is a State of origin, shall take the appropriate steps to ensure that transboundary movement is authorized and takes place only with the prior notification and consent of the State of destination;*
 - ii) *Transboundary movement through States of transit shall be subject to those international obligations which are relevant to the particular modes of transport utilized;*
 - iii) *A Contracting Party, which is a State of destination, shall consent to a transboundary movement only if it has the administrative and technical capacity as well as the regulatory structure, needed to manage the spent fuel or the radioactive waste in a manner consistent with this Convention;*
 - iv) *A Contracting Party, which is a State of origin, shall authorize a transboundary movement only if it can satisfy itself in accordance with the consent of the State of destination that the requirements of subparagraph iii) are met prior to transboundary movement;*
 - v) *A Contracting Party, which is a State of origin, shall take the appropriate steps to permit re-entry into its territory, if a transboundary movement is not or cannot be completed in conformity with this Article, unless an alternative safe arrangement can be made.*
2. *A Contracting Party shall not licence the shipment of its spent fuel or radioactive waste to a destination south of latitude 60 degrees South for storage or disposal.*
3. *Nothing in this Convention prejudices or affects*
 - i) *The exercise, by ships and aircraft of all States, or maritime, river and air navigation, rights and freedoms as provided for in international law;*
 - ii) *Rights of a Contracting Party, to which radioactive waste is exported for processing to return or provide for the return of, the radioactive waste and other products after treatment to the State of origin;*
 - iii) *The right of a Contracting Party to export its spent fuel for reprocessing;*
 - i) *Rights of a Contracting Party, to which spent fuel is exported for reprocessing to return, or provide for the return of, radioactive waste and other products resulting from reprocessing operations to the State of origin.*

I.1 General Requirements for Safety at Borders

In SR the transboundary movement of spent fuel and RAW, imports, exports are governed by the Atomic Act (Act No. 541/2004 Coll.) and by the ÚJD SR Decree No. 57/2006 Coll., transposing the Council Directive 2006/117/Euratom of 20 November 2006 on the supervision and control of shipments of radioactive waste and spent nuclear fuel, which is based on the IAEA recommendations formulated in the documents of TS-R-1 series. Approval of the type of transportation equipment is issued at the most for five years. Authorization for SNF shipment can be issued for up to one year and in case of RAW shipment for up to three years.

The Act No. 541/2004 Coll. allows for import of RAW, which resulted from treatment and conditioning of RAW exported for this purpose and their re-entry was approved in advance by ÚJD SR and also allows import of RAW for its treatment and conditioning on the territory of SR if export of RAW with proportional

activity was contractually agreed and approved by ÚJD SR. Any other import of RAW to SR is prohibited. The Atomic Act specifies exactly, in Section 3 (8), which are those states to which it is prohibited to transport RAW.

The Act No. 408/2008 Coll., which amended and supplemented Atomic Act (No. 541/2004 Coll.), transposed the Council Directive 2006/117/Euratom on the supervision and control of shipments of radioactive waste and spent nuclear fuel and at the same time through a reference to the Commission Decision 2008/312/Euratom of 5 March 2008, establishing a standard document for the supervision and control of shipments of RAW and SNF, referred to in Council Directive 2006/117/Euratom, *templates of standard documents on supervision and control in the transport of RAW and SNF were adopted.*

Act No. 388/202 Coll., amending Act No. 17/1992 Coll. on the Environment, adopted a provision on the ban on the import of radioactive waste for the purpose of incineration, which has not been produced on the territory of the Slovak Republic, with effect from 1 January 2022.

I.1.1 Basic requirements for Safety Documentation

The safety documentation shall contain a set of measures for efficient protection of persons, property and environment against the consequences of irradiation during shipment of radioactive materials. This protection is assured by separation of radioactive contents and environment, by control of dose rates during shipment, by prevention of criticality achievement and by prevention of shipment damage due to released and absorbed heat.

These measures must apply to all activities and conditions associated with the movement of radioactive materials; they include design, maintenance and repair of transportation equipment, preparation, expedition, loading, transfer including storage during transport, unloading and acceptance of consignment at the point of shipment destination.

I.1.2 Shipment Authorisation

Shipments of radioactive materials

Radioactive materials (nuclear material, radioactive waste and spent nuclear fuel) may only be transported based on shipment authorization issued by the ÚJD SR to consignor and by means of transportation equipment, which was approved by the ÚJD SR.

Authorization for shipment of radioactive materials shall not be required for shipment of:

- a) products from non-irradiated natural and depleted uranium and non-irradiated thorium,
- b) nuclear materials which total amount transported within period of 12 consecutive calendar months not exceed:
 - 1. 500 kg of natural non-irradiated uranium or
 - 1. 1,000 kg of non-irradiated depleted uranium and non-irradiated thorium.

Application for the authorization for shipment of radioactive waste to the EU Member States or other countries shall be submitted by the applicant using a standard document. The document contains statement confirming that the radioactive waste will be taken back and if it is not possible to assure its

shipment to the consignee or should the shipment become impossible under conditions imposed by the competent authorities of other countries.

Authorization for shipment is issued for each shipment separately. Where the same type of radioactive materials is concerned, with the same type of shipment by the same consignor, ÚJD SR may issue the authorization for shipment of radioactive materials or spent nuclear fuel for a repeated shipment for a period of one year, and in case of RAW for up to three years.

The ÚJD SR issues the authorization for shipment of radioactive waste and approval of transportation equipment type in a form a decision.

The Decision issued by the Authority for shipment of radioactive materials, shall specify (in addition to usual requisites):

- a) the type of the authorization,
- b) the identification mark assigned by the Authority,
- c) the date of issue and validity period,
- d) the list of relevant Slovak and international legal provisions, including the International Atomic Energy Agency's Regulations for the Safe Shipment of Radioactive Materials, under which the shipment is authorized,
- e) any restrictions on the shipment mode, the type of the transportation equipment, the shipping container, and eventual possible instructions on the transport route,
- f) the following statement: "This permit shall not relieve the consignor from the obligation to comply with the requirements under legal rules of the states to or through which the shipment is to be effected.",
- g) a detailed list of additional operational inspections necessary during preparation, loading, transport, disposal, unloading and handling of the consignment, including eventual special provisions concerning disposal in terms of safe heat dispersion and sub-criticality assurance,
- h) the reference to information provided by the applicant related to any special activities to be carried out prior to the shipment,
- i) the reference to the relevant approval of the transportation equipment type or the consignment project,
- j) a specification of the actual radioactive content, which may not be obvious from the nature of the package; this must include the physical and chemical form, the relevant total activity (or activities of different radioisotopes), the amount of fissile material, if any, in grams, and a statement that the material being transported is not low dispersible radioactive material,
- k) a specification of the relevant Quality Assurance Program.

The ÚJD SR may make the authorisation subject to such conditions, as it deems necessary.

The ÚJD SR may issue authorization for transportation of radioactive materials also under special conditions, which shall contain besides the essentials mentioned above also:

- temperature range of surrounding environment, for which the approval for transport under special conditions was issued,

- detailed list of additional operational controls required during shipment, loading, transport, stowage, unloading and handling with the consignment, including possible special provisions on stowage with respect to safe heat dispersion,
- reasons for transport under special conditions (if appropriate/necessary),
- description of compensatory measures to be used, if the transport is taking place under special conditions,
- reference to information provided by the applicant relating to used consignments or specific acts to be performed prior to shipment.

To ensure radiation protection for the transport of radioactive material, except for transport within the site of a nuclear installation, the dose rate cannot:

a) exceed 2 mSv.h⁻¹ at any point on the outer surface of the consignment or outer packaging under normal transport conditions,

b) under conditions of exclusive use, at any point on the outer surface of the consignment or the outer packaging, exceed 10 mSv.h⁻¹ under conditions specified by special regulations,

c) under normal transport conditions, exceed 2 mSv.h⁻¹ at any point on the surface of the means of transport, and 0,1 mSv.h⁻¹ at a distance of 2 m from the surface of the means of transport.

I.1.3 Type-approval of Transport Equipment

In the decision, by which the UJD SR approves the type of transport equipment, it shall state (in addition to the usual particulars):

- a) The type of approval certificate,
- b) The identification label assigned by the Authority,
- c) The date of issue and validity period,
- d) Possible restrictions on the shipment mode,
- e) The list of relevant Slovak and international legal provisions, including the International Atomic Energy Agency's Regulations for the Safe Shipment of Radioactive Materials, based on which the type of transportation equipment/consignment project was approved,
- f) The following statement: "This permit shall not relieve the consignor from the obligation to comply with the requirements under legal rules of the states to or through which the shipment is to be made".
- g) The reference to approval of alternative radioactive content, to validate approvals of other relevant bodies or additional technical data and information according to the requirements of the Authority,
- h) The declaration of transportation authorization, if the decision combines approval of consignment project with shipment authorization,
- i) Identification of package set,
- j) The description of package set in the form of reference to drawings or project specification. If appropriate, also reproducible illustration not larger than 21x30 cm, illustrating the consignment together with a brief description, including the used material, total weight, total outside parameters and the appearance,

- k) Specification of consignment project with reference to drawings,
- l) Specification of authorized radioactive content, including possible restrictions of radioactive content, which may not be obvious from the nature of package set; this shall include the physical and the chemical form, the relevant activity level (or activities of various radioisotopes), the amount of possible fission material in grams, and a statement as to whether the material to be transported is not a low dispersion radioactive material,
- m) Additional for consignments of fission material:
 - 1. Detailed description of authorized radioactive content,
 - 2. Sub-criticality (CSI) index value,
 - 3. Reference to documentation, which proves the sub-criticality content,
 - 4. Other special circumstances, from which absence of water is assumed in certain free areas when assessing sub-criticality,
 - 5. Any assumptions, based on which decrease of neutron multiplication is expected, as a result of real course of irradiation when assessing sub-criticality,
 - 6. Temperature range of the surrounding environment, for which the type of transportation equipment was approved,
- n) For consignments of B(M) type explanatory information, which may be useful for other relevant authorities,
- o) Detailed list of additional operational controls required in preparation, loading, stowage, unloading and handling with the consignment, including potential special provisions on stowage with respect to safe heat dispersion,
- p) Reference to information provided by the applicant relating to used consignments or specific actions to be performed prior to shipment,
- q) Declaration concerning surrounding conditions used in the consignment project,
- r) Specification of a relevant quality assurance program,
- s) Reference to consignor identity, if necessary.

I.1.4 Authorisation for Shipment of Radioactive Materials

Pursuant to Act No. 87/2018 Coll. on radiation protection, the permit from the MDV SR in terms of radiation protection is required for the transport of radioactive material with an activity higher than the activity of classified consignments. This obligation shall also apply to shipments by entities, whose registered office or place of business is in another Member State, and are holders of authorisation in that State.

Pursuant to Act No 87/2018 Coll. on Radiation Protection, the ÚVZ SR authorises the transport of a radioactive substance or a fissile substance, a radioactive source, radioactive waste, spent nuclear fuel and radioactively contaminated objects which, due to their activity, cannot be released from administrative control within the premises of a nuclear installation.

In its application, the applicant for a transport authorisation shall indicate its business name, legal form, registered office and identification number, if the applicant is a legal person, place of

business, name, surname and place of residence of the persons who are the statutory body, name, surname, *contact details, number and date of issue of the certificate of professional competence* of the professional representative.

The applicant shall attach to the application:

- Characteristics of the planned activity leading to exposure and a description of the technical equipment, and
 - Justification for the shipment,
 - Transport regulations *including a specification of the mode of transport and measures to ensure radiation protection during transport, including the route, if known,*
 - a description of the technical equipment to ensure transport including loading and unloading,
 - assessment of risks arising from the nature of transported radioactive material, mode of transport and transport routes,
 - emergency plan for the shipment,
 - documents on the packaging set,
 - proof of the vehicle's roadworthiness,
 - proof of competence to operate the means of transport.

The MD SR and the ÚVZ SR shall issue an authorisation for the transport of radioactive materials if the application contains the required particulars, the applicant and the professional representative meet the required conditions, and the requirements for ensuring radiation protection have been demonstrated to be met. The authorisation shall be issued for an indefinite period.

I.2 Experience with Transboundary Shipments of Spent Nuclear Fuel and Radioactive Waste

The process of transboundary shipment of RAW is governed by section 16 of Act No. 541/2004 Coll., which implements the Council Directive 2006/117/Euratom of 20 November 2006 on supervision and control during shipment of radioactive waste and spent nuclear fuel.

In the past, ÚJD SR issued authorization for shipment of SNF from a research reactor in the Czech Republic to the Russian Federation within the US initiative - Global Threat Reduction Initiative. All transboundary shipments of spent nuclear fuel were made based on consents and authorizations from the relevant regulatory and administrative authorities of the State of Origin after notification to the State of destination and with its consent.

In 2018, the ÚJD SR issued an authorisation for the import of RAW from Italy for its treatment by incineration, while the secondary waste generated from treatment was shipped back to Italy after completed treatment of the entire intended amount of RAW, in December 2023.

In 2019, the ÚJD SR issued 2 authorisations for imports of IRAO from Germany and Italy for their treatment by incineration. Under these authorisations, there were 2 shipments of IRAW from Germany and 9 shipments of IRAW from Italy, with the resulting secondary waste from treatment in both cases being exported back to the country of origin during 2020-2023. As this was IRAW, the competent authority for authorising international shipments under Council Directive 2006/117/Euratom on the supervision and control of shipments of RAW and SNF, was the MD SR.

Based on the ÚJD SR authorisation for shipment of compactable RAW from the Czech Republic, in *October 2023* there was 1 shipment of this RAW to the Slovak Republic, and the products of the treatment (mouldings) were exported back to the Czech Republic. Repeated transports will be made between 2024 and 2026.

In both cases of licensing the transport of RAW originating from the Czech Republic and Italy and the return transport of treatment products, the process of communication with the authorities of the country concerned as well as of the transit countries was conducted in accordance with Act No 408/2008 Coll., amending Act No 541/2004 Coll. (Atomic Act) and the relevant standard documents were used.

I.3 Experience with Transboundary Shipment of Radioactive Materials

Transboundary shipments of radioactive materials, in terms of radiation protection, are assessed in the same way as national shipments. *The holder of an authorisation for the shipment of radioactive materials with a total activity exceeding the activity of classified consignments, no later than 24 hours before the start of the shipment must, based on Section 105 of Act No. 87/2018 Coll. on radiation protection, notify the MD SR and the competent regional authority, unless a special regulation states otherwise:*

- a) name and address of the carrier, consignor and consignee,
- b) telephone number of the carrier,
- c) date, time, method and route of transport,
- d) type of vehicle, in case of a motor vehicle, also its registration number,
- e) UN number and shipment index of each consignment, *if known*,
- f) Type, activity and physical form of transported radioactive materials,
- g) For transboundary shipments, the date and time of each crossing of state border.

No deficiencies in terms of radiation protection have been detected so far in the course of the state supervision of the MD SR during the transport of radioactive materials.

J Disused Sealed Sources

Article 28 of the Joint Convention

Disused Sealed Sources

1. *Each Contracting Party shall, in the framework of its national law, take the appropriate steps to ensure that the possession, remanufacturing or disposal of disused sealed sources takes place in a safe manner.*
2. *A Contracting Party shall allow for re-entry into its territory of disused sealed sources if, in the framework of its national law, it has accepted that they be returned to a manufacturer qualified to receive and possess the disused sealed sources.*

The Government has established a national policy and strategy, as well as a regulatory framework for ensuring radiation protection and safety of sources of ionising radiation in the territory of the Slovak Republic. Handling of various sources of ionizing radiation is generally subject to state supervision in accordance with the requirements of Act No. 87/2018 Coll. on Radiation Protection, and state supervision in the field of radiation protection is exercised by radiation protection inspectors of ÚVZ SR as the primary competent supervisory authority in the field of radiation protection.

Act No. 87/2018 Coll. on radiation protection establishes the basic conditions and requirements for the management of ionizing radiation sources (in health care for treatment and diagnostics, in industry, in energy sector, in research, etc.), including their use, import, distribution, sale, lease, etc., defines the basic obligations of operators of ionizing radiation sources and establishes the Central Register of Ionizing Radiation Sources, which is maintained by the ÚVZ SR. A graded approach is applied to the management of ionising radiation sources.

A natural person - entrepreneur or a legal person who intends to carry out an activity leading to radiation exposure with a source of ionising radiation is obliged to:

- a) notify the performance of an activity leading to exposure,*
- (b) apply for a registration decision; or*
- (c) apply for an authorisation.*

In the same way, in order to control the movement of radioactive sources and to ensure their safety, radioactive sources are classified according to their activity into categories 1 to 5 in accordance with Act No. 87/2018 Coll. on Radiation Protection.

The competent radiation protection authority shall issue a registration decision or authorisation to the applicant on the basis of an application which shall include, inter alia:

- a description of the activity leading to the exposure,*
- evidence of type approval of the ionising radiation source, evidence of tests carried out on ionising radiation sources,*
- proof of operator training,*
- operating procedures for the safe handling of the ionising radiation source,*
- radiation protection programme.*

The competent radiation protection authority shall register or authorise, within the scope of its competence, an activity leading to radiation exposure if the application for registration or authorisation has the required particulars, the applicant for registration or authorisation or the professional representative designated by the applicant for registration or authorisation satisfies the condition of competence and the applicant for registration or authorisation has demonstrated compliance with the requirements for ensuring radiation protection.

In addition to the above, an applicant for an authorisation to carry out an activity leading to radiation exposure who will dispose of a high-activity source, shall be required to deposit a security in the amount of the full costs associated with the collection, sorting, storage, treatment, conditioning for disposal and disposal of the disused high-activity source as radioactive waste to an account in accordance with a special regulation, except for an applicant who submits the following:

- a take-back contract with the manufacturer or supplier of the high-activity source,*
- contract for commercial insurance against the cost of disposal of the high-activity source for insolvency at the time the source becomes a disused source or an abandoned source; or*
- a disposal contract for high-activity source with the holder of an authorisation for the collection, sorting, storage, treatment, conditioning for disposal and disposal of IRAW at the time the source becomes disused.*

There are currently approximately 2,300 legal entities and natural persons - entrepreneurs in the Slovak Republic who hold registration and authorisations for the use of sources of ionising radiation.

No sealed radioactive sources are produced in the Slovak Republic. Sealed radioactive sources are imported into the SR mainly from EU Member States and the Russian Federation.

Currently, approximately 1,100 sealed radioactive sources and devices containing a radioactive source are registered in the Central Register of Sources of Ionising Radiation.

For the safe management of IRAW, including disused sources, essentially the same principles apply as for the management of the radioactive sources themselves:

- it is necessary to ensure that the exposure of workers and the public is as low as reasonably achievable,*
- it is necessary to ensure that there is no unauthorised handling of radioactive sources or radioactive waste.*

According to Act No 87/2018 Coll. on Radiation Protection, a disused source is a radioactive source that is no longer used in an activity leading to radiation exposure, its further use is not foreseen, but its safe handling is still required.

The holder of an authorisation for activities leading to radiation exposure with a source of ionising radiation is obliged to hand over the sealed source to a supplier, manufacturer or an organisation authorised by the UVZ SR for the collection, assembly, storage and treatment of radioactive sources, including ionising fire detectors, for disposal without delay, no later than 12 months from the date on which the sealed source has become unused, the operation of a site intended for the collection or

storage of radioactive sources, including transport within the site, or for the management of SNF and the management of RAW, including the collection, sorting, storage, treatment, conditioning for disposal and disposal of RAW, unless otherwise specified by the competent radiation protection authority, and to notify the competent radiation protection authority and the Central Register of Sources of this fact; attach to the notification a copy of the acceptance certificate for the sealed source.

The Government of the Slovak Republic, by Resolution No 610 of 2 September 2009, approved a draft procedure for the management of IRAW and RMUO in the Slovak Republic and authorized JAVYS, a. s., to build a complex facility for the acceptance, sorting and long-term safe storage of such materials.

On 25 February 2016, JAVYS, a.s. commissioned the "IRAW and ZRAM Management Facility" at the Mochovce site, thus providing the final link in the comprehensive and optimal management of IRAW and RMUO (ZRAM) originating from the entire territory of the Slovak Republic. The commissioning of this facility represents an increase in the reliability, continuity and safety of activities in the IRAW and RMUO management system in the Slovak Republic (see Chapter D.2.5.).

Following the commissioning of the IRAW and ZRAM Management Facility, all IRAW and RMUO intended for long-term disposal at this facility were transferred from the certified TSU RAO storage facilities at the Jaslovské Bohunice site. In addition, based on the concluded contracts, various types of IRAW (used sealed sources, used liquid scintillators, liquid and solid radioactivity etalons, common laboratory waste - gloves, glass, chemicals, also materials containing natural radionuclides) was collected.

IRAW and RMUO containing nuclear materials are stored until their final treatment, conditioning and disposal in dedicated spaces in the Intermediate Spent Fuel Storage Facility at the Jaslovské Bohunice site.

As part of the ongoing efforts to implement the Code of Conduct in the Slovak Republic, the main achievements and advances of the past period are:

- implementation of the campaign "Amnesty for disused sources of ionizing radiation and radioactive materials" in 2022/2023*
- adoption of Act No. 119/2023 Coll., amending the Act No. 87/2018 Coll. on radiation protection (effective from 15 April 2023).*

The adoption of the aforementioned amendment to Act No. 87/2018 Coll. on Radiation Protection created a legal framework and space for the Slovak Republic to sign up to the requirements of the document that complements the Code of Conduct – Guidance on the Import and Export of Radioactive Sources.

The implementation of the above document will ensure the regulation of possible import of sources of ionizing radiation to the territory of the Slovak Republic and the detection of possible illegal handling of radioactive materials.

Making the necessary legislative changes will create the conditions to translate the political commitment to implement the Supplementary Guidance – “Guidance on the Import and Export of Radioactive Sources”.

Management of captured nuclear and radioactive materials of unknown origin (RMUO)

Following developments in recent years, an essentially routine practice in the interception of nuclear and/or radioactive materials has been established, based on internationally accepted practice. *To reduce the risk of illicit handling of disused radioactive materials and their possible diversion for terrorist purposes, there is also a need for active search and procedures aimed at prevention, early detection and rapid response to avoid endangering the health of the public. The ÚVZ SR has developed procedures for intervention personnel. According to this guideline, the radiation protection officers would report the received fact concerning illegal handling of disused radioactive materials to the Police Force. However, there are still gaps in the coordination of the activities of the different departments and institutions involved.*

Dozens of seizures occur in Slovakia involving radioactive sources, radioactively contaminated objects, in particular parts for agricultural machinery, metal objects contaminated with vapour and parts of military equipment (on-board aircraft instruments containing radioactive phosphorescent paints with ^{226}Ra).

Recently, the number cases to be addressed has been declining.

The following table shows an overview of the number of RMUO in the period 2009 - 2023.

Number of RMUO during 2009 – 2023 received by JAVYS, a. s. for further management	
Year	Number of RMUO
2009	20
2010	9
2011	12
2012	33
2013	31
2014	12
2015	14
2016	8
2017	17
2018	14
2019	8
2020	6
2021	8
2022	10
2023	9

Table 13 Number of RMUO in the period of 2009 – 2023

The ÚVZ SR is currently continuing its campaign to search for disused radioactive sources and radioactive material from activities carried out in the past, in cooperation with the relevant regional public health offices based in Bratislava, Nitra, Banská Bystrica and Košice. As part of the campaign, the ÚVZ

SR issued an information leaflet on the seizure of radioactive materials in scrap metal for distribution to collection points throughout the Slovak Republic.

In 2023, 9 intercepted sources of ionising radiation were reported. These were mainly agricultural equipment components contaminated with ^{60}Co radionuclide, military equipment components contaminated with ^{238}U -rad, ^{238}U -rad safe, ^{40}K and subsidiary decay products of the ^{238}U series, ^{241}Am fire detectors, uranyl acetate ^{238}U , ^{235}U , ^{234}U .

To reduce the risk of illicit handling of radioactive materials and their potential misuse for terrorist purposes, in December 2011, the Government of the Slovak Republic and the US Government signed a joint "Action Plan to Combat Illicit Disposal of Nuclear and Radioactive Materials" in Brussels, aimed at prevention, early detection and a rapid response to cases of illicit handling of radioactive materials and their subsequent safeguarding so as not to endanger the health of the population or misuse them for terrorist purposes.

The ÚVZ SR ensures the implementation of the Joint Action Plan of the Government of the Slovak Republic and the Government of the United States of America to Combat Illicit Disposal of Nuclear and Radioactive Materials and Related Technologies. To continue intergovernmental cooperation between the Slovak Government and the U.S. Government to provide a program to reduce the global threat of potential diversion of nuclear and radioactive materials ("Global Threat Reduction Initiative") and related technologies, several negotiations were held in 2023. According to the established plan, in 2024 there will be two activities focused on the physical protection of sources of ionizing radiation within workplaces with sources of radiation in the Slovak Republic and on-site inspection at the workplace where sources of ionizing radiation of categories 1 to 3 are used.

K Measures to Improve Safety

K.1 Implemented planned measures from 2020

- **To build a dry storage for SNF by completing (extending) the storage capacity of the current ISFS**

The measure is being implemented.

In preparation for the *implementation of the project for the completion of storage capacity of the Interim Spent Fuel Storage facility*, documentation was prepared in accordance with the legislative requirements of the SR and EC, and in accordance with Act No. 24/2006 Coll. on environmental impacts assessment, an EIA process was conducted, *which was closed with a positive Final Opinion of MŽP SR on the proposed activity No. 1064/2016-3.4/hp. The implementation of the project for the completion of the storage capacity of the Interim Spent Fuel Storage Facility started after the signing of a contract between JAVYS, a. s. and an external contractor concluded in accordance with the Public Procurement Act. The design documentation was submitted to ÚJD SR in July 2020, together with the application for a building permit. ÚJD SR authorised the change of the completed structure in the scope of IPR: "Completion of SNF storage capacities" (building permit) by Decision No.76/2021, which entered into force on 5 June 2021. Consent for the implementation of the change to the ISFS was issued by the ÚJD SR by Decision No.174/2021, which became final on 2 September 2021. Subsequently, the construction of new storage capacities of SNF continued with the implementation of construction works and delivery and installation of related technological equipment and systems. Currently the project is in its final phase of implementation, which includes active complex testing of all technological equipment and systems, the implementation of which will take place after the issuance of the final Decision of the ÚJD SR in 2024. After the successful completion of the active comprehensive tests, an application will be submitted to the ÚJD SR for an authorisation for the operation (see Chapter 1.1.).*

- **Building the workplace for melting metal RAW in Jaslovske Bohunice**

Measure fulfilled.

Approval for the construction of the metal RAW melting plant was issued by Decision No. 424/2017 of ÚJD SR pursuant to the Atomic Act, and by Decision No. 411/2017 a building permit was issued for this project pursuant to the Building Act. Following the completion of construction and technology work, inactive complex tests were successfully completed and evaluated, and subsequently active complex tests were conducted in June 2022 following the issuance of the authorisation to place the metal RAW melting facilities into active operation. After their successful completion and evaluation, an application was submitted to the ÚJD SR for a permit for the continuous operation of the facility, which was approved in August 2022. The permit for the use of the construction ("final approval decision") was issued by the ÚJD SR in June 2023 (see Chapter 2.2.).

- **Continue in stage III and IV of NPP A1 decommissioning**

Measure fulfilled.

After obtaining positive opinions from the EC, MŽP SR, ÚJD SR and ÚVZ SR, from 1 October 2016 stage 3 and 4 decommissioning NPP A1 started, within which safety valves and emergency valves of steam generators were decommissioned in full, decommissioning of gantry crane used at the time of construction of A1 for the installation of steam generators, decommissioning of oil management – turbo-compressors and all technological equipment in the gas management building. Furthermore, decommissioning of technological equipment of the heavy water management CO₂ cooling systems, pumping station for the coolant for the spent nuclear fuel (SNF) from NPP A1 Chrompik and Dowtherm, steam generators *PG3 and PG4*, solidification of sludge phases from the pool for long-term storage of SNF from NPP A1, *vitrification of the coolant for SNF from NPP A1 with high activity – Chrompik*, treatment of cases for long-term disposal of SNF from NPP A1, remediation of contaminated soils and contaminated water, and other decontamination activities, dismantling, fragmentation of related technological equipment, and management of radioactive waste produced. *At the same time, the documentation for the next phase – Phase V - of NPP A1 decommissioning has been prepared, where the environmental impact assessment process is underway and which is planned to start in 2025.* All decommissioning activities of NPP A1 are implemented in accordance with the schedule of Decommissioning Plan for stage III and IV of NPP A1, and preconditions are created for meeting all the objectives, that is completion of stage III and IV of decommissioning of NPP A1 by the end of 2024 (see Chapter D.3.2.).

- **Continue in the implementation of stage II of decommissioning of NPP V1**

Activity in progress.

Activities of stage 2 of decommissioning of NPP V1 (2015 – 2027) focus on dismantling of equipment and primary circuit structures of NPP that are in the controlled zone, i.e. decommissioning of the nuclear island. Other unnecessary external objects of NPP V1, tanks, underground pipelines and cable lines will be dismantled as well. After the site has been restored to its original condition (or after clearance) and its final inspection, the site will be released from the scope of the Atomic Act. Decommissioning of NPP V1 is implemented through sub-projects. *From the total number of 74 BIDSF Projects, currently there are 5 projects in the implementation phase. Another project is in the preparatory phase.* JAVYS, a. s., after obtaining an authorisation for decommissioning, implements activities that represent irreversible changes to the technologies of the power plant within the controlled zone of the main production Unit of the NPP, such as for example, dismantling of large-scale components of the primary circle and dismantling of the most contaminated equipment (reactor pressure vessels of both units, steam generators, main circulating pumps, primary circuit piping and other technological components), as well as the implementation of other related projects. Parallel with the dismantling activities, a continuous process of management of the RAW, their shipment and release of materials meeting the criteria for release into the environment takes place (see Chapter D.3.1.).

- **Change in the system of treating liquid radioactive concentrates in NPP Mochovce**

Activity in progress.

Every operator of a nuclear power plant is obliged to minimize production of radioactive waste. One of the measures taken in 2017 to increase safety is to improve the system for RAW treatment at NPP Mochovce, which will allow significant reduction in the volume of liquid RAW produced so far. The current method of managing the RA-concentrate in NPP Mochovce is based on their transfer from the storage tanks at NPP Mochovce to the facility – Final treatment of KRAO, where RA-concentrate is fixed into a cement or bitumen matrix. The balance of the existing process of RA-concentrate treatment shows that the activity of the final product intended for final disposal reaches a level up to 1 % of the permitted concentration limit, which points to a large reserve in the use of space of RÚ RAO in Mochovce.

New equipment was added to the existing system to capture radionuclides from the concentrate using sorbents and to subsequently reduce the volume of the inactive concentrate by drying it to a crystalline salt. The inactive salts are released to the environment as hazardous waste (not as RAW).

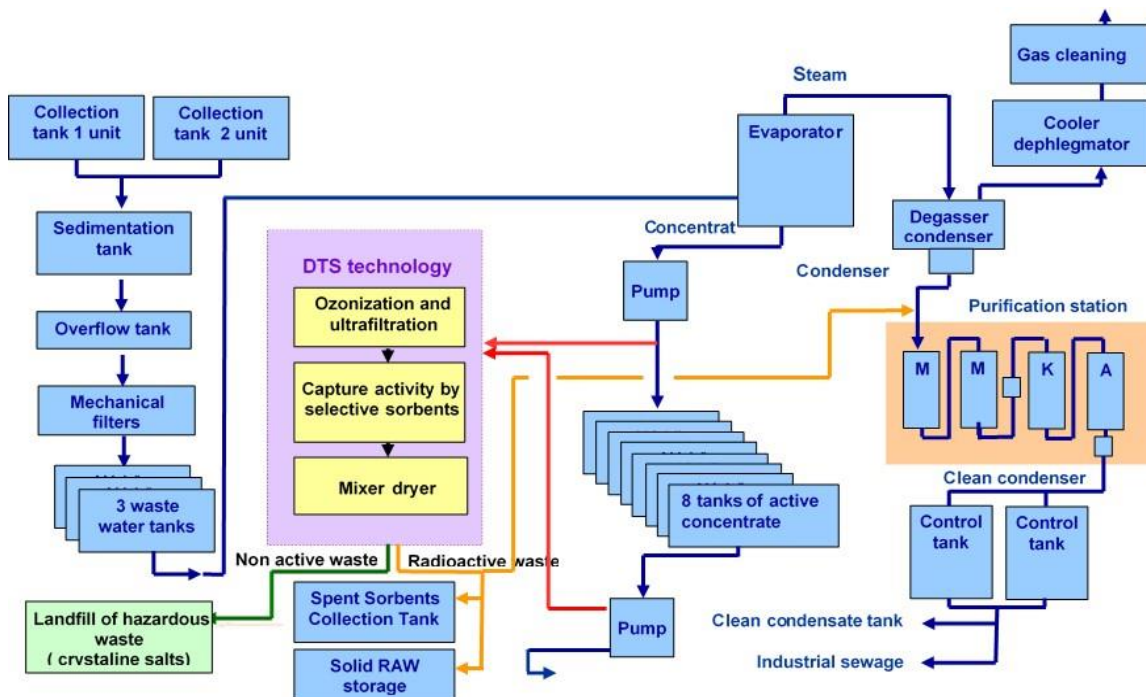


Fig. 28 Scheme of treatment of radioactive liquid concentrates at NPP Mochovce

Treatment of radioactive liquid concentrates by Avantech technology achieves separation of dissolved salts from radioactive nuclides, their crystallization and then released into the environment as “hazardous waste” (pursuant to Act No. 223/2001 Coll. on wastes) with a total mass activity lower than 100 Bq/kg (based on limit values from Act No. 87/2018 Coll. on radiation protection). In the process, the radioactive nuclides are concentrated in the sludge or captured on selective sorbents and thus the resulting volume of RAW is significantly reduced to about 8% of the original volume. The new facility was tested for existing RA-concentrates under laboratory conditions on a scaled-down model system.

The RA-concentrate processing plant consists of the following subsystems:

- a pre-treatment system – ozone oxidation, powder sorbent cleaning and ultrafiltration,
- a system of after-treatment with selective sorbents,
- drying mixer system.

The system has been designed for batch treatment of concentrate with capacity of about 100 m³/y.

Expected completion of the design change is in 06/2025.

An overview of the proposed system for liquid RAW treatment is shown in Fig. 30.

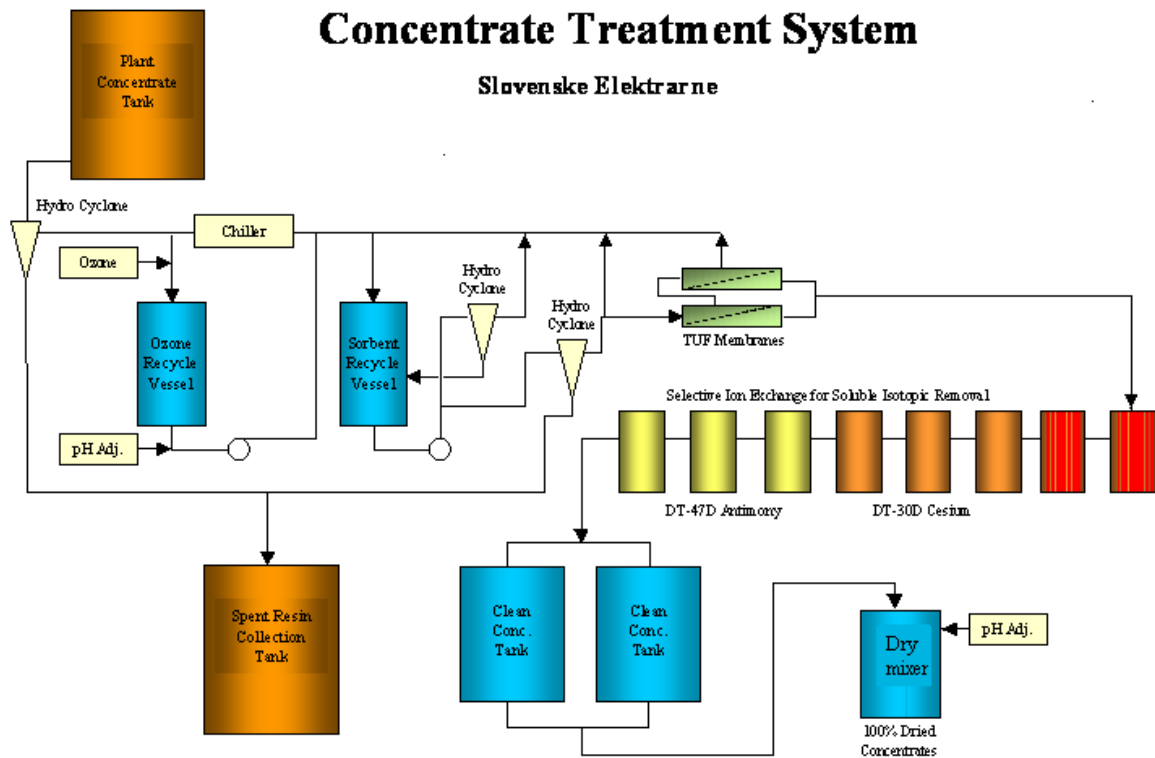


Fig. 29 Scheme of liquid RAW treatment at SE, a. s.

PROPOSED GOOD PRACTICE CASE:

The application of an immediate dismantling strategy combined with the treatment of all materials arising is considered to be outstanding. The integrated approach of JAVYS, a.s. and other participating organizations to the decommissioning project V1 effectively supported optimized execution of all technical activities in a timely and cost-effective manner. Furthermore, the openness of JAVYS, a.s in sharing their experience can be highly beneficial to a number of comparable present and future decommissioning projects. This good practice has been also recognized by the ARTEMIS mission which took place in 2023.

Fulfilling the criteria of a good practice case:

1. New or revised Technology:

Decommissioning is a commonly used technology.

2. Significant contribution to safety:

Project at V1 reactor applies a strategy of immediate decommissioning. This includes segmentation and subsequent processing of all waste items including the heaviest components such as pressure vessels and steam generators. Where necessary, specific segmentation and treatment techniques have been developed. Other waste streams are treated according to procedures already established for operational waste. Only waste which after treatment does not comply with the acceptance of the National Radioactive Waste Repository is stored thus minimizing the burden on future generations.

3. Tried and proven by at least one Contracting Party but not widely implemented:

Project planning and control, development of necessary technologies, execution of dismantling activities and comprehensive management of associated material as it is generated were combined in a highly integrated manner. This allowed for the timely conduct of the V1 decommissioning project within the planned budget. The combination of an immediate decommissioning strategy with the treatment of all generated waste was the basis. Experience and lessons learned as well as newly developed technologies are openly communicated and made available to comparable projects internationally.

4. Applicable to other Contracting Parties with similar programs:

This practice is applicable to all Contracting Parties, which have nuclear power plants.

As the two V1 reactors represent a larger fleet of comparable VVER-440-V230 reactors, JAVYS, a.s., in cooperation with the IAEA, made its experience available to interested parties at a training course (2022). JAVYS, a.s. is ready to make its specific technologies available to other decommissioning projects upon request.

K.2 Planned measures to increase safety

In the following period JAVYS, a. s. plans to implement the following measures:

- *Continue in the preparation for the implementation of stage V of decommissioning of NPP A1;*
- *Continue in the implementation of stage II of decommissioning of NPP V1;*
- *Putting new storage SNF capacity in ISFS into active operation;*
- *Successful completion of implementation of the change introduced on the RAW management technologies in Jaslovské Bohunice;*
- *preparation and implementation of changes on the technologies for RAW management in Jaslovské Bohunice under the project “Optimization of treatment capacities of technologies for treatment and conditioning of RAW of JAVYS, a. s., in Jaslovské Bohunice site”.*

K.3 International Missions

See section E.2.1.5.

K.4 Transparency and Public Relations

In the Slovak Republic the right to information is guaranteed by the Constitution and by other documents on human rights since the beginning of 90-ties. The Act No. 211/2000 Coll. (Act on Free Access to Information) provides to the public a legal way to obtain the necessary information. This Act together with the Act No. 541/2004 Coll. (the Atomic Act) and Act No. 24/2006 Coll. (Act on Environmental Impact Assessment and on amendments and complements to certain laws) form the legislative framework for communication with the public in the field of nuclear energy.

Pursuant to the Act No. 541/2004 Coll. (section 27, par. 4) the licence holder is obliged to inform ÚJD SR on events in the operated nuclear installations and in case of incident or accident in accordance with section 28 (5) of the law, he must also inform the public. Among the obligations of the licensee, according to the Atomic Act (Section 10 (1) (m)), is to inform the public also about assessment of nuclear safety at the nuclear installations operated by the licensee. Act No. 24/2006 Coll. transposes the EU Directive in the given field (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 well as the Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (Notification of the MZV SR 43/2006) ("Aarhus Convention") not only in the field of public information, but also public participation on the decision-making processes concerning environmental issues. The operation, safety improvements at NIs at Jaslovské Bohunice V2 and Mochovce, as well as construction of Units 3&4 in Mochovce, influenced the life in those regions significantly, which has required necessary intensification in the communication with the regions in the vicinity of NIs, as well as on a national level. Transparent information on all aspects of construction, *commissioning*, operation and decommissioning of NI after the definite shutdown of operation and the disclosure of information through publicly available information channels has become an integral part of the open policy of licence holders and regulatory bodies *in information and participation of stakeholders in the decision-making processes*. The most important communication channels include:

- *Information Centres of JAVYS, a. s., at Mochovce and Jaslovské Bohunice sites, average annual visit, approx. 5 thousand visitors + tours of facilities for selected groups;*
- *Information Centre of Slovenské elektrárne, a.s., Energoland Mochovce (annually 12 – 15-thousand visitors) + tours of NPP Mochovce and Jaslovské Bohunice for students of schools with technical study programs and visits by interested public – representatives of local self-governments, members of the NR SR, members of the Parliamentary Economic Committee, foreign experts, including representatives of Austrian Government, etc.;*

- *Information Centre Energoland organizes also other events for the public, such as: a Night in Energoland, which is part of the European Night of Museums and Galleries, special programmes for summer children's universities, summer camps, etc.;*
- *Periodical "JAVYS in our country", published by JAVYS, a. s. - distributed free of charge also in the regions of Jaslovské Bohunice and Mochovce + online version;*
- *Periodical "Nuclear Energy", co-publication of the Centre of Research Řež and the ÚJD SR – distributed to the relevant institutions, schools and libraries;*
- *Online version of the Annual Report on the Safety of Operation of NPP Jaslovské Bohunice and NPP Mochovce with WANO indicators and other indicators of impacts on the environment;*
- *Online version of the Annual Report of ÚJD SR providing information on the activities of the regulatory body and informing about the state of nuclear safety of nuclear installations in the Slovak Republic;*
- *Websites of licence holders – www.seas.sk, www.energoland.sk, www.javys.sk and regulatory body - ÚJD SR – www.ujd.gov.sk and the National Nuclear Fund – www.njf.sk;*
- *Social networks Facebook, LinkedIn, You Tube, Instagram, Twitter;*
- *Portal www.slovensko.sk - Central Official Electronic Notice Board (CÚET), on which ÚJD SR publishes the prescribed information and which works as a nationwide communication point for all public administration authorities in relation to the public;*
- *Touch information kiosk of ÚJD SR, fulfilling 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;*
- *Civil Information Commissions (hereafter only as CIC) Mochovce and Jaslovské Bohunice, consisting of elected and other representatives of the regional public. Members of CIC hold regular meetings with the management of licensees, as well as with the representatives of the regulators and thus they are getting qualified first-hand information;*
- *Regional associations of towns and municipalities, which also communicate with *license holders in the given region and with the regulatory bodies* (www.zmo.sk, www.zdruzeniemochovce.sk);*
- *CSR (Corporate Social Responsibility) programmes of licence holders to help in areas of common benefit (education, health care and charity, culture, sports, environment);*
- *Events for the employees and the public, organised by Slovenske elektrárne, a.s., on the occasion of the completion of power testing of Unit 3 of NPP Mochovce;*
- *Videos on the commissioning of the new EMO3 unit, interviews with EMO/MO34 managers on the commissioning process, a new 3D model of VVER 440 explaining the process of electricity generation and the operation of safety systems in the plant, available on seas.sk, energoland.sk or the YouTube channel of Slovenske elektrárne;*

- Lectures at schools and other events, e.g. *Ekotopfilm Festival*, through which – Slovenské elektrárne, a.s., can reach out to additional more than 15-thousand students of primary and secondary schools;
- Other: seminars for journalists, mayors and representatives of self-government; press conferences and briefings at significant events, press releases for the media, active participation at national and foreign events (conferences, workshops, etc.).



Fig. 30 Selected publications

Communication and informing the public by all available means and channels is one of the main priorities of ÚJD SR, which results from its status and competence. The primary objective of communication with the public is to inform the domestic and foreign public about developments in the activities of the ÚJD SR and to build public confidence in the activities of the ÚJD SR through up-to-date, objective and comprehensible information and two-way open communication.

As a central authority of the state administration, the ÚJD SR provides information in its area of competence upon request and at the same time proactively publishes information on the status of nuclear installations in the Slovak Republic and on its activities as a regulatory authority, thus enabling the public and the mass media to check data and information on nuclear installations, as well as on the ÚJD SR.

The main communication channel with the public is the website (www.ujd.gov.sk), therefore, among other things, nuclear safety laws and regulations, related legislation, full texts of safety guides are published and regularly updated. On the website, and also through the open data portal data.slovensko.sk, the ÚJD SR permanently makes available selected open data files, so-called datasets, such as all orders, contracts, invoices and the list of licence holders.

In addition to the above-mentioned information, all administrative proceedings, as well as decisions issued by the ÚJD SR in full text with reasons are published on the Authority's website, thus the Authority fulfils its legal obligation pursuant to Section 3(6) of the Act on Administrative Proceedings (see also

chap. E.2.1.2). In addition, the ÚJD SR, through its website and also on the portal www.slovensko.sk through CUET, fulfils the obligation of the administrative authority pursuant to Section 26 of the Administrative Procedure Act and Section 8(10) of the Atomic and Building Act to serve important documents in administrative proceedings by public announcement. ÚJD SR has a touch information kiosk, having the function of the Official Notice Board of ÚJD SR, where it is possible to view the pending administrative proceedings, and decisions issued by the Authority. Also the website of the ÚJD SR is available there to the public. The touch screen information kiosk is located at the seat of ÚJD SR in Bratislava – in front of the building and is accessible to the public 24 hours a day.

Public awareness of activities related to the peaceful uses of nuclear energy is closely linked to enabling public participation in the decision-making process in the various authorisation procedures for these activities. Public participation in the decision-making process is ensured at all stages of the nuclear fuel cycle. The authorisation process for the above-mentioned activities clearly recognises and allows for public participation in the decision-making process. The ÚJD SR continuously informs the general public about its activities and individual administrative proceedings initiated, pending and completed pursuant to Section 3(6) of Act No 71/1967 Coll. on administrative proceedings (Administrative Procedure Code), on all procedural acts at all stages of the processes through the standard information channels of the ÚJD SR, which are the official notice board of the ÚJD SR, the electronic official notice board of the Office located on the web site of the ÚJD SR (www.ujd.gov.sk), which are available to the public 24 hours a day, as well as through the CUET. This system creates the preconditions for comprehensive and timely information to the public in order to optimally involve them in decision-making processes. Authorisation procedures for activities related to the peaceful uses of nuclear energy are administrative procedures and are governed by Act No 71/1967 Coll. on Administrative Procedure (Administrative Procedure Code), which establishes procedural rights relating to the status of a party to the proceedings. They allow the parties and the public to influence the course of the proceedings through the possibility of making observations, submitting procedural motions and amendments, as well as applying remedies.

Following the amendment of Act No. 24/2006 Coll. on Environmental Impact Assessment in 2010 and 2014, the term "public" was expanded to mean any natural or legal person or their organisations and groups. The public concerned is that part of the public which is affected or likely to be affected by, or has an interest in, a given environmental action. Sections 24 and 25 regulate the participation of the public and the public concerned in proceedings under Act No 24/2006 Coll. on Environmental Impact Assessment, including the provision for participation in the subsequent authorisation procedure, which is regulated by special regulations. The public is informed of the proceedings via the website of the competent authority. The public concerned shall have the status of a party to the screening procedure and the environmental impact assessment procedure and, subsequently, the status of a party to the authorisation procedure, irrespective of its legal interest in the matter.

The public has the right to express an interest in the proposed activity by submitting a written opinion or comments, as well as the right to appeal, for example, against the final opinion issued by the MŽP SR. The public may also participate and lodge an appeal in the subsequent authorisation procedure under the Atomic Act.

ÚJD SR has competencies in the field of public information regarding nuclear safety and monitors other media sources with the aim to obtain the necessary overview on the information policy of the given entity. ÚJD SR is a regulatory body, which independently from licensees of nuclear installations provides information on nuclear safety of nuclear installations including information on the safety of RAW, SNF management, nuclear materials, their control and record keeping, as well as information on other stages of fuel cycle.

Every year, in accordance with the Atomic Act, ÚJD SR prepares an Activity Report on the results of activities of ÚJD SR and on safety of nuclear installations for the past year, which is submitted to the Government and to the National Council. The Annual Report is also published in the Slovak-English version, it is in electronic form and it is accessible to the public on the ÚJD SR website. Information on the release of the current annual report is distributed to the ministries, other central state administration authorities, state organizations, to the embassies of foreign states in the Slovak Republic, and the Slovak embassies abroad, foreign regulatory bodies, international and other organizations and schools.

ÚJD SR places extraordinary emphasis on communication with the public in the region with nuclear installations, striving for continuous improvements in a form of cooperation with Civic Information Commission, the representatives of municipalities, as well as by distribution of information materials, such as annual reports, leaflets and by making contributions to the regional press and TV.

In cooperation with Civic Information Commission or with the municipalities discussions are being organized with the public both on nuclear safety, as well as RAW management.

ÚJD SR continuously informs Slovak news agencies, newspapers and electronic media about its domestic and foreign activities and organises press conferences for journalists. Together with the State Office for Nuclear Safety of the Czech Republic (SÚJB), the ÚJD SR was the publisher of the professional journal 'Nuclear Safety', aimed at presenting the latest knowledge in the field of nuclear safety in the Slovak Republic and the Czech Republic. The journal was taken over by the Research Centre Řež in the second half of 2019 after changes made by SÚJB, and in cooperation with ÚJD SR continues to publish the journal under the original title "Nuclear Energy". The journal is available free of charge online and printed editions are distributed primarily to relevant institutions, schools and libraries. The planning and implementation of the activities of the ÚJD SR towards informing the public is also largely influenced by the results of public opinion surveys, which the Authority carries out on a regular basis at two levels. A nationwide public opinion survey is alternated with a local survey at an annual interval, where respondents answer questions on the perception of nuclear safety, the provision of information by the licensee and the state supervision, or the level of trust towards stakeholders. The results of the surveys are published on the Authority's website in both Slovak and English.

With regard to emergency preparedness, district authorities and municipalities are required by Act No. 42/1994 Coll. on Civil Protection of the Population, to permanently publish relevant information for the public on their website or on a public notice board. The information shall be reviewed, updated if necessary and published in an updated form at least once every three years. Information for the public shall include, in particular, information on the source of the hazard, information on the possible extent of the emergency and the consequences for the affected area and the environment, the hazardous

properties and identification of substances and preparations likely to cause the emergency, information on how to warn the public and on rescue operations, the tasks and measures to be taken after the occurrence of the emergency, details of where to obtain further information related to the public protection plan. State and local authorities, as well as operators of nuclear installations, issue guides for the public containing advice for citizens, which aim to provide as much information as possible on what to do and how to behave in the event of natural disasters, accidents or catastrophic events.

Information on incidents and accidents

Act No. 541/2004 Coll. (Atomic Act) in Section 27 (4) (f) states that the holder of the licence is obliged to inform persons in the territory of the nuclear power plant without delay about the occurrence of an incident or accident according to Section 27 (3) (b) or (c) of the Atomic Act, about the measures for health protection and about the activities to be carried out in the event of their occurrence. Act No 541/2004 Coll. (Atomic Act), Section 28 (22), provides that the licence holder and the district authorities in the seat of the region concerned by the emergency response are obliged, upon the occurrence of an incident or accident, to inform the public without delay of the facts relating to the incident or accident, of the steps to be taken and, if necessary, of the measures for the protection of the health of the public concerned.

Act No. 541/2004 Coll. (Atomic Act) in Section 4 (1) stipulates that the UJD SR informs the public without delay about incidents and accidents of nuclear installations on the territory of the SR, as well as without delay about accidents of nuclear installations outside the territory of the SR with possible impact on the territory of the SR. In the event of a major incident or accident at a nuclear installation, information will be made available to the public on a special - emergency - website of the UJD SR, which will be activated in such cases. The regulatory body shall further inform the public about events during the transport of radioactive materials on the territory of the SR or outside the territory of the SR with a possible impact on the territory of the SR, about serious deficiencies in nuclear installations and measures taken to eliminate them, and about other facts related to the nuclear safety of nuclear installations on the territory of the SR.

Disclosure of information in case of danger

Decree of the UJD SR No. 55/2006 on details in emergency planning in case of an incident or accident in Section 11 stipulates that for informing the public, the holder of the licence pursuant to Section 5(3)(b) to (d) of the Atomic Act shall provide the Ministry of the Interior of the SR with the information pursuant to a special regulation. The license holder shall inform the public through a public information point established under a special regulation and through the permit holder's website. A representative of the information point shall be included in the emergency response organisation. The Decree further provides in Section 20 that in the event of notification of a transportation incident or accident, the licence holder must report the incident or accident to the Authority immediately by telephone and provide written notification of the transportation incident or accident no later than 45 minutes after its discovery. It shall inform the public within 30 minutes at the latest if the transport accident or incident has been assessed as INES 2 or higher.

Information provided to the regulatory bodies of other States

The UJD SR ensures international cooperation in the scope of the Atomic Act, including the fulfilment of the obligations of the Slovak Republic arising from international treaties to which the Slovak Republic is bound, as well as fulfilling the function of a contact point and fulfilling other reporting obligations to the IAEA and EU institutions within the scope of its competence.

Sensitive Information

Access to sensitive information and to information pursuant to Article 2 of Act No. 215/2004 Coll. on the Protection of Classified Information (the "Act No. 215/2004 Coll.") is limited. Pursuant to Article 3 (1) of Act No. 215/2004 Coll. according to the level of secrecy, classified information are divided into top secret, secret, confidential and restricted.

Act No. 541/2004 Coll. (Atomic Act) in Section 3 (16) defines documentation containing sensitive information as documentation the disclosure of which could be used to plan or carry out activities to cause disruption or destruction of a nuclear installation, thereby adversely affecting public safety and causing environmental or economic damage. This documentation shall be made available after exclusion of sensitive information. The list of documentation containing sensitive information is specified in Annexes 1 and 2 of the Atomic Act.

L Annexes

- I. List of nuclear facilities for the SNF and RAW management
- II. Reference levels of annual releases of radioactive substances to the environment
- III. List of nuclear facilities in decommissioning
- IV. Inventory of stored SNF
- V. Inventory of stored RAW
- VI. List of national laws, decrees and guides
- VII. List of international expert reports (also safety reports)
- VIII. List of authors

Annex I. List of Nuclear Facilities for Spent Nuclear Fuel (SNF) and Radioactive Waste (RAW) Management

Slovenské elektrárne, a. s. (SE, a. s.) operates:

- Nuclear Power Plant Jaslovské Bohunice, NPP V2 - Units 3 & 4;
- Nuclear Power Plant Mochovce, Units 1 & 2;
- *Nuclear Power Plant Mochovce, Units 3 & 4.*

Nuclear and Decommissioning Company (JAVYS, a. s.) operates:

- Interim Spent Fuel Storage Facility (ISFS) in Jaslovske Bohunice;
- Technologies for RAW Treatment and Conditioning (TSÚ RAO) in Jaslovske Bohunice;
- Integral RAW Storage Facility (IS RAO) in Jaslovske Bohunice;
- Final Treatment of Liquid RAW (FS KRAO) in Mochovce;
- National RAW Repository (RÚ RAO) in Mochovce.

Nuclear facilities in decommissioning are listed under Annex III.

Annex II. Reference levels of annual radioactive releases into the environment

Radionuclides activity values in gaseous and liquid discharges are part of L&C approved by ÚVZ authorities.

The basic radiological limit for limiting the exposure of the general public in the vicinity of a nuclear facility caused by release of radioactive materials into the atmosphere and into surface water us the effective dose of a representative person, is 250 μ Sv per calendar year.

A representative person, pursuant to Act No. 87/2018 Coll. on radiation protection means an individual from a general public representing a group of natural persons, who are most exposed to the source and the route, except for natural persons with extreme or unusual habits.

The creation of two entities at the Jaslovské Bohunice site in 2006 (JAVYS, a. s. and SE, a. s.) gave rise to division of reference levels of annual discharges almost equally between SE, a. s. (i.e. NPP V2) and JAVYS, a. s. (i. e. NPP V1, NPP A1, TSÚ RAO and ISFS). In this, permanent shutdown of Unit 3 of NPP V1 in 2006 and 2008 and the fact that discharges from facilities for RAW and SNF management are significantly lower than discharges from NPP in operation, were taken into account. *New reference levels of annual discharges were established in 2011.*

Gaseous discharges				
Reference levels of annual discharges for the group of NI	Noble gases (any mixture)	Iodines (gaseous and aerosol phase)	Aerosols – mixture of long-lived radionuclides	^{89, 90} Sr
	Bq/year	Bq/year	Bq/year	Bq/year
Jaslovské Bohunice site after 2007				
All NIs	4.10 ¹⁵	1,3.10 ¹¹	1,6.10 ¹¹	3.10 ⁸
Jaslovské Bohunice site from 2007 till 2011				
JAVYS, a. s. (incl. NPP V1)	2.10 ¹⁵	6,5.10 ¹⁰	8,1.10 ¹⁰	1,6.10 ⁸
SE, a. s. NPP V2	2.10 ¹⁵	6,5.10 ¹⁰	8.10 ¹⁰	1,4.10 ⁸
Jaslovské Bohunice site from 2011				
JAVYS, a. s. (incl. NPP V1)	-	-	8,1.10 ¹⁰	1,7.10 ⁸
SE, a. s. NPP V2	2.10 ¹⁵	6,5.10 ¹⁰	8.10 ¹⁰	1,4.10 ⁸
Mochovce site				
NPP Mochovce 1&2	4,1.10 ¹⁵	6,7.10 ¹⁰	1,7.10 ¹¹	Not limited
Liquid discharges				
Reference levels of annual discharges for the group of	Tritium Bq/year		Other corrosive and fission products Bq/year	

NIs	recipient Váh	recipient Dudváh	recipient Váh	recipient Dudváh
Jaslovské Bohunice site before 2007				
All NIs	4,37.10 ¹³	4,37.10 ¹¹	3,8.10 ¹⁰	3,8.10 ⁸
Jaslovské Bohunice site from 2007				
JAVYS, a. s. (incl. NPP V1)	3.10 ¹³	2,3.10 ¹¹	2,5.10 ¹⁰	2,5.10 ⁸
SE, a. s. NPP V2	2.10 ¹³	2.10 ¹¹	1,3.10 ¹⁰	1,3.10 ⁸
Jaslovské Bohunice site from 2011				
JAVYS, a. s. (incl. NPP V1)	1,2.10 ¹³	5,7.10 ¹⁰	2,5.10 ¹⁰	2,5.10 ⁸
SE, a. s. JE V2	2.10 ¹³	2.10 ¹¹	1,3.10 ¹⁰	1,3.10 ⁸
Mochovce site				
Mochovce NPP 1&2	1,2.10 ¹³		1,1.10 ⁹	

Reference levels of annual liquid discharges from RÚ RAO

Nuclide	Reference level of annual discharges [Bq]/year
³ H	1,88.10 ¹⁰
¹³⁷ Cs	2,28.10 ⁷
⁹⁰ Sr	2,44.10 ⁸
⁶⁰ Co	2,24.10 ⁷
²³⁹ Pu	5,56.10 ⁵

Annex III. List of Nuclear Installations in Decommissioning

Jadrová a vyrad'ovacia spoločnosť, a. s. (JAVYS, a. s.):

- Nuclear Power Plant Jaslovské Bohunice – NPP A1 (incl. Technology for RAW management from this NPP installed within its premises),
- Nuclear Power Plant Jaslovské Bohunice – NPP V1 (Units 1 and 2).

Annex IV. Inventory of Stored Spent Nuclear Fuel (as at 31 December 2023)

The interim Spent Nuclear Fuel storage facility of JAVYS, a. s. as at 31 December 2023 stored 12,712 SNF from the production of NI V1, V2 and NPP Mochovce, in the following breakdown:

As of 31 December 2023, a total of 1,266 SNF assemblies were stored in the SNF storage pools at the NPP V2 and NPP Mochovce.

Note: By using advanced design of nuclear fuel, SNF production is gradually going down.

Annex V. Inventory of Stored RAW

V.1 Inventory of Stored Radioactive Waste (RAW) at SE, a.s., NPP EBO (as at 31 December 2023)

Storage of solid RAW *on pallets*

Storage	Total capacity [pallets]	Filled capacity [pallets]	Available [pallets]
Total	1 920	55	1 865

Storage of solid RAW *in drums without built-in*

Storage	Total capacity [pieces of drums]	Filled capacity [pieces of drums]	Available [pieces of drums]
Total	1 998	301	1 697

Storage of air filters in Storage building 108/12

Storage	Total capacity [pieces of drums]	Filled capacity [pieces of drums]	Available [pieces of drums]
Total	912	79	833

Storage of solid RAW with higher activity (Mogilnik)

Tank	Total capacity [cells]	Filled capacity [cells]	Available [cells]
Total	529	256	273

Storage of RA-concentrate

Tank	Capacity [m ³]	Filled capacity [m ³]	Available space [m ³]
Total	4 210	957	3 253

Storage of ion exchange resins

Tank	Capacity [m ³]	Filled capacity [m ³]	Available volume [m ³]
Total	920	96,4	823,6

V.2 Inventory of Stored Radioactive Waste (RAW) at SE, a.s., NPP Mochovce EMO12 (at as 31 December 2023)

Storage of solid RAW on pallets

Storage	Total capacity [pallets]	Filled capacity [pallets]	Available [pallets]
Total	914	345	569

* the volume of one pallet is 0,5 m³

Storage of solid RAW in drums without built-in

Storage	Total capacity [pieces of drums]	Filled capacity [pieces of drums]	Available [pieces of drums]
Total	864	2	862

Storage of air filters

Storage	Total capacity [pieces of drums]	Filled capacity [pieces of drums]	Available [pieces of drums]
Total	470	224	246

Storage of solid RAW with higher activity (Mogilnik)

Tank	Total capacity [cells]	Filled capacity [cells]	Available [cells]
Total	529	142	387

Storage of RA-concentrate

Tank	Capacity [m ³]	Filled capacity [m ³]	Available space [m ³]
Total	2 110	995,4	1 114,6

Storage of ion exchange resins

Tank	Capacity [m ³]	Filled capacity [m ³]	Available volume [m ³]
Total	460	5,8	454,2

Inventory of Stored Radioactive Waste (RAW) at SE, a.s., NPP Mochovce MO3 (at as 31 December 2023)

The RAW inventory at NPP MO3 consists only of RA-concentrate, solid RAW was not established as at 31 December 2023.

Storage of RA-concentrate

<i>Tank</i>	<i>Capacity [m³]</i>	<i>Filled capacity [m³]</i>	<i>Available space [m³]</i>
Total	1 560	27	1 533

V.3 Inventory of stored RAW as at 31 December 2023 in JAVYS, a. s.

Criteria used to define and categorize waste

In the Slovak Republic (Act No. 541/2004 Coll.) any unusable materials in gaseous, liquid or solid form are defined as radioactive waste, which due to the content of radionuclides in them or due to the level of their contamination with radionuclides cannot be released into the environment.

The division of radioactive waste into classes is based on their disposability and it is defined in Section 5 of ÚJD SR Decree No. 30/2012 Coll., as amended by ÚJD SR Decree No. 101/2016 Coll., laying down the details of requirements for the management of nuclear materials, radioactive waste and spent nuclear fuel. According to this Decree, RAW is divided according to their activity into the following classes (according to the IAEA Safety Guide GSG-1 Classification of Radioactive Waste):

Release levels enabling release into the environment for individual radionuclides are given in Annex 5 to the Act No. 87/2018 Coll. on radiation protection.

Inventory of stored RAW as at 31 December 2023		
ÚJD SR Decree No. 30/2012 Coll.	IAEA Safety Guide GSG-1	RAW stored in JAVYS, a. s.
	Exempt waste (EW): Waste that meets the criteria for clearance, exemption or exclusion from regulatory control for radiation protection purposes as described in Ref. [6].	
Transient radioactive waste , the activity of which during storage due to a very short half-lives will fall below the limit value for their release into the environment,	Very short lived waste (VSLW): Waste that can be stored for decay over a limited period of up to a few years and subsequently cleared from regulatory control according to arrangements approved by the regulatory body, for uncontrolled disposal, use or discharge. This class includes waste containing primarily radionuclides with very short half-lives often used for research and medical purposes.	666,709 kg solid RAW (cca 765 m ³)

<p>Very low level radioactive waste, the activity of which is slightly higher than the limit value for their release into the environment, preferably contain radionuclides with short half-life or also radionuclides with long half-life in low concentration, which require lower degree of isolation from the environment with a system of engineered barriers or do not require the use of engineered barriers, and the time of institutional control of the repository is shorter than in the case of surface type of RAW repository,</p>	<p>Very low level waste (VLLW): Waste that does not necessarily meet the criteria of EW, but that does not need a high level of containment and isolation and, therefore, is suitable for disposal in near surface landfill type facilities with limited regulatory control. Such landfill type facilities may also contain other hazardous waste. Typical waste in this class includes soil and rubble with low levels of activity concentration. Concentrations of longer lived radionuclides in VLLW are generally very limited.</p>	<p>9 445,400 kg solid RAW (cca 7 871 m³)</p>
<p>Low level waste, the average mass activity of long-lived radionuclides, especially alpha-emitting radionuclides, is lower than 400 Bq/g, the maximum mass activity of long-lived radionuclides, especially alpha-emitting radionuclides, is locally lower than 4,000 Bq/g, do not produce residual heat and after conditioning, meet the limits and conditions of safe operation for the surface type of RAW repository,</p>	<p>Low level waste (LLW): Waste that is above clearance levels, but with limited amounts of long lived radionuclides. Such waste requires robust isolation and containment for periods of up to a few hundred years and is suitable for disposal in engineered near surface facilities. This class covers a very broad range of waste. LLW may include short lived radionuclides at higher levels of activity concentration, and also long lived radionuclides, but only at relatively low levels of activity concentration.</p>	<p>5 291,416 kg solid RAW (cca 7 256,6 m³) + 582.2 m³ liquid RAW</p>
<p>Intermediate level waste, the average mass activity of long-lived radionuclides, especially alpha-emitting radionuclides, equals to 400 Bq/g or is higher, may produce residual heat and measures for its removal are lower than in the</p>	<p>Intermediate level waste (ILW): Waste that, because of its content, particularly of long lived radionuclides, requires a greater degree of containment and isolation than that provided by near surface disposal. However, ILW needs no provision, or only limited provision, for heat dissipation during its storage</p>	<p>344.460,66 kg solid RAW (45,57m³) +</p>

<p>case of high-level waste and after conditioning do not meet the limits and conditions of safe operation for surface type of RAW repository,</p>	<p>and disposal. ILW may contain long lived radionuclides, in particular, alpha emitting radionuclides that will not decay to a level of activity concentration acceptable for near surface disposal during the time for which institutional controls can be relied upon. Therefore, waste in this class requires disposal at greater depths, of the order of tens of metres to a few hundred metres.</p>	<p>0,85 m³ liquid RAW</p>
<p>High level waste, the average mass activity of short and long-lived radionuclides, especially alpha-emitting radionuclides, exceeding values set for low-level and intermediate-level waste, can be disposed only in the deep type of RAW repository, while measures to remove residual heat represent significant factor in the design of these repositories.</p>	<p>High level waste (HLW): Waste with levels of activity concentration high enough to generate significant quantities of heat by the radioactive decay process or waste with large amounts of long lived radionuclides that need to be considered in the design of a disposal facility for such waste. Disposal in deep, stable geological formations usually several hundred metres or more below the surface is the generally recognized option for disposal of HLW.</p>	

Spent nuclear fuel is currently not considered as high-level radioactive waste.

V.4 Inventory of Stored Radioactive Waste (RAW) at JAVYS, a. s. (as at 31 December 2023)

RAW stored at the facilities of JAVYS, a. s.

Secondary RAW occurs in the current time in connection with decontamination, disassembly and demolition works in nuclear installations, which are in decommissioning (NPP A1, NPP V1).

Inventory of Stored RAW at NPP V1 (as at 31 December 2023)

Filling of storage areas for solid RAW storage

Storage of solid RAW

Storage	Total capacity [m ³]	Filled capacity [m ³]	Available [m ³]
Total	2 507	241,5	2 265,5

Storage of RA-concentrate*

Tank	Capacity [m ³]	Filled capacity [m ³]	Available space [m ³]
Total	428	170,3	257,7

* Only ZT10N-2 tank available. Other tanks dismantled as part of V1 decommissioning projects

Storage of low- and medium-active sorbents**

Tank	Capacity [m ³]	Filled capacity [m ³]	Volume recalculated to total salinity 190g/l [m ³]	Available space [m ³]
Total	856	290	Not measured	566

** Only tanks ZT20N-1, ZT20N-2 available. Wastewater is collected in the reservoirs mainly from the drainage and rinsing of technological equipment, from the fragmentation and decontamination works of the D4.4C.01 project, and from the operating equipment at KP of NPP V1.

Other tanks dismantled as part of V1 decommissioning projects.

Due to historical reasons, RAW from NPP A1 *Jaslovské Bohunice* represents a special problem, since it was not either consistently sorted nor registered during operation of this installation. A large amount of liquid operational RAW has already been treated and conditioned for disposal, or the activity of these waste was decreased. Continuously occurring concentrates (approx. 35 m³ per year) are every year treated by cementation. At the end of 2023, the total inventory of *such* liquid RAW (including non-concentrated) was 163 m³.

Aggregate amounts of solid RAW at NPP A1 in 2023 reached 2 840,172 tons of metal RAW, 638,382 tons of other RAW, 9 430,797 tons of contaminated soil and debris.

Storage	Total capacity [m ³]	Utilization [m ³]	Available capacity [m ³]
Total	17 589	3 774,602	13 814,398

Storage spaces for storage of PRAO are filled with 200 l drums, 2EM-01 containers, ISO containers and fence pallets.

As of 31 December 2023, certified storage facilities of JAVYS, a. s., stored:

- In the storage facilities of TSÚ RAO (obj. 30,32,34): 9,589 pcs of 200 l drums;
- In the storage facilities of TSÚ RAO (obj. 723): 95 pcs of 200 l drums;
- In the storage facilities of TSÚ RAO (obj. 641): 6,379 pcs of 200 l drums, 237 pcs of 2EM-01 containers and 562 fence pallets;
- In IS RAW: 8,444 of 200 l drums, 540 fence pallets, 11 FCCs in TK 210, 20 FCCs in TK 150, 30 FCCs in TK 080, 8 FCCs and 6 pcs of ISO containers with RAW.

Inventory of solid RAW placed in objects of JAVYS, a. s.:

No.	RAW type	Volume [cca m ³]	Weight [t]
	Total	15 893	15 409,75

Inventory of liquid RAW JAVYS, a. s. in total: 583,05 m³

V.5 Amounts of Radioactive Waste (RAW) treated or conditioned at TSÚ RAO at Jaslovské Bohunice and FS KRAO at Mochovce in 2023

TSÚ RAO + FS KRAO	Conditioned (treated)	year 2023	
Filled FCC		404 pcs	
Transported to RÚ RAO		392 pcs	
TSÚ RAO	Type of waste	Amount	
Operational set (PS) – BSC RAW PS 04 – Cementation	KRAO (concentrate, washing liquid, sludge, ion exchanges)	319,685 m ³	
	PRAO (bituminous product, mouldings, ashes, other matrix)	400,015 m ³	

PS 06 – Incinerator	<p>Solid RAW (total)</p> <p>NPP A1 NPP V1 NPP V2 NPP Mochovce 1,2 Other producers</p> <p>Liquid RAW (total) NPP A1 – Dowtherm, oil NPP V1 – oil NPP V1 – sorbents NPP V2 – sorbents Other producers</p>	<p>61,967 t</p> <p>52,784 t 2,845 t 0,502 t 0,138 t 5,698t</p> <p>3,401 m³ 0,502 m³ 0,64 m³ 0 m³ 1,709 m³ 0,55 m³</p>	
PS 08 – Compactor	<p>Total</p> <p>NPP A1 NPP V1 NPP V2 NPP Mochovce 1,2 Other producers IRAW</p>	<p>657,598 t</p> <p>293,445 t 254,617 t 14,598 t 18,612 t 75,234 t 1,092 t</p>	
PS 03 – Concentration	<p>Total</p> <p>Concentrate NPP V1 Concentrate NPP V2</p>	<p>0 m³</p> <p>0 m³ 0 m³</p>	
PS 05 – Sorting	Solid RAW	0 t	
Operating set - 809	KCV		
Concentration KCV at PS 44, PS 100	NPP A1 NPP V1 NPP V2	0 m ³ 0 m ³ 0 m ³	
DBL	Sorbents	0 m ³	
PS45 – Incinerator	<p>Solid RAW (total)</p> <p>NPP A1 NPP V1 NPP V2 NPP Mochovce 1,2 Other producers</p> <p>Liquid RAW (total) NPP A1 – oil NPP V1 – oil NPP V1 – sorbents NPP V2 – sorbents Other producers</p>	<p>237,655 t</p> <p>0 t 24,563 0,941 t 0 t 212,151 t</p> <p>2,23 m³ 0 0 0 2,23 m³ 0</p>	
Operating set – obj.41	RA-water	1414,9 m ³	
Operating set – Facility for treatment of metal RAW	<p>Metal RAW (total)</p> <p>NPP A1 NPP V1 NPP V2 NPP EMO</p>	<p>394,126 t</p> <p>331,614 t 50,274 t 4,089 t 8,149 t</p>	

Operating set – Final treatment of metal RAW	<i>Total</i>	<i>218,842 t</i>	
	<i>NPP A1</i> <i>NPP V1</i>	<i>214,923 t</i> <i>3,919 t</i>	
Operating set – Treatment of air filters – PS 009	Air management - filters (total)	<i>15 t</i>	
	NPP A1	<i>4,188 t</i>	
	NPP V1 Others producers	<i>4,135 t</i> <i>6,677 t</i>	
FS KRAO	Type of waste	Amount	
Concentration KCV	Concentrate NPP Mochovce 1,2	0 m ³	
Cementation of RAW	Cementation		
	Solid RAW Liquid RAW	<i>115,762 m3</i> <i>99,489 m3</i>	
DBL – FS KRAO	Sorbents	<i>0 m3</i>	

RAW disposed at the national repository at Mochovce

By the end of 2023, there were 7,398 FCCs disposed in total, representing cca 22 933,8 m³ solidified RAW from NPP A1, NPP V1 and NPP V2 and NPP Mochovce 1&2. A substantial part of these wastes consisted of concentrates in the form of cement grout of FCCs, liquid waste solidified to 200 l drums, *large-scale metal RAW* and solid waste treated before pouring into FCCs by high pressure compacting.

Annex VI. List of Selected National Laws, Decrees and Guidelines

- Act No. 71/1967 Coll. on Administrative Procedure (Administrative Procedure Code) – the latest amendment as Act No. 177/2018 Coll.
- Act No. 50/1976 Coll. on spatial planning and the construction code (the Construction Act) – the latest amendment as Act No. 46/2024 Coll.
- Act No. 42/1994 Coll. on civil protection of the population – the latest amendment as Act No. 205/2023 Coll.
- Act No. 575/2001 Coll. on organization of government activities and on organization of the central state administration – the latest amendment as Act No. 7/2024 Coll.
- Act No. 215/2004 Coll. on protection of classified information and on amendments to certain laws – the latest amendment as Act No. 364/2020 Coll., Act No. 423/2020 Coll.
- Act No. 220/2004 Coll. on protection and utilization of agricultural land and on amendment to Act No. 245/2003 Coll. on integrated prevention and on environmental pollution control and on amendments to certain laws as amended – last amendment, Act No. 205/2023 Coll.
- *Act No. 364/2004 Coll. on waters and on amendment to Act of SNC No. 372/1990 Coll. on offences as amended (Water Act) as amended – the latest amendment – Act No. 272/2023 Coll.*
- Act No. 541/2004 Coll. on the Peaceful use of nuclear energy (the Atomic Act) and on amendment and alternations of several acts as amended – the latest amendment as Act No. 309/2023 Coll.
- Act No. 24/2006 Coll. on environmental impact assessment and on amendments to certain laws as amended – the latest amendment as Act No. 272/2023 Coll.
- Act No. 124/2006 Coll. on occupational health and safety and on amendments to certain laws – the latest amendment as Act No. 205/2023 Coll.
- Act No. 125/2006 Coll. on labour inspection and on amendment to Act No. 82/2005 Coll. on undeclared work and illegal employment and on amendments to certain laws – the latest amendment as Act No. 113/2022 Coll.
- Act No. 355/2007 Coll. on protection, support and development of public health and on amendments and complements to certain laws – the latest amendment as Act No. 120/2024 Coll.
- Act No. 309/2009 Coll. on promotion of renewable sources of energy and high efficiency cogeneration and on amendments to certain laws – last amendment Act No. 363/2022 Coll.
- *Act No. 7/2010 Coll. on flood protection as amended – the latest amendment Act No. 272/2023 Coll.*
- Act No. 254/2011 Coll. on transportable pressure equipment and on amendments to certain laws as amended by Act No. 56/2018 Coll.

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- Act No. 250/2012 Coll. on regulation in network industries – the last amendment of Act No. 433/2022 Coll.
 - Act No. 251/2012 Coll. on energy sector and on amendments and complements to certain laws – the latest amendment as Act No. 205/2023 Coll.
 - Act No. 133/2013 Coll. on building products and on amendments to certain laws as amended by Act No. 177/2018 Coll.
 - Act No. 54/2015 Coll. on civil liability for nuclear damage and on its financial coverage and on amendments to certain laws – *the latest amendment as Act No. 363/2021 Coll.*
 - Act No. 56/2018 Coll. on assessment of product conformity, making the product available on the market and amending certain laws – *the latest amendment as Act No. 351/2022 Coll.*
 - Act No. 87/2018 Coll. on radiation protection and on amendments to certain laws – the latest amendment as Act No. 205/2023 Coll.
 - Act No. 308/2018 Coll. on the National Nuclear Fund and on amendments to Act No. 541/2004 Coll. on the peaceful uses of nuclear energy (Atomic Act) and on amendments to certain laws as amended – last amendment Act No. 221/2019 Coll.
 - *Act No. 200/2022 Coll. on spatial planning – the latest amendment Act No. 46/2024 Coll.*
 - *Act No. 201/2022 Coll. on construction – effective from 1 April 2025 – the latest amendment Act No. 46/2024 Coll.*
 - *Act No. 205/2023 Coll. on amendments to certain laws in connection with the reform of building legislation – the latest amendment as Act No. 46/2024 Coll.*
 - *Act No. 272/2023 Coll. on amendments to certain laws on environmental protection in the context of the reform of building legislation – the latest amendment as Act No. 46/2024 Coll.*
 - Government Ordinance No. 276/2006 Coll. on minimal safety and health requirements for work with display units.
 - Government Ordinance No. 387/2006 Coll. on requirements for ensuring safety and health signs at work as amended by Government Ordinance No. 104/2015 Coll.
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 - Government Ordinance No. 393/2006 Coll. on minimal requirements for safety and health at work in potentially explosive environment.

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- Government Ordinance No. 395/2006 Coll. on minimal requirements for provision and use of personal protective equipment – *the latest amendment as Government Ordinance No. 400/2021 Coll.*
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 - Government Ordinance No. 436/2008 Coll. laying down the details of technical requirements and conformity assessment procedures for machinery – as amended by Government ordinance No. 140/2011 Coll.
 - *Government Ordinance No. 269/2010 Coll., laying down requirements for the achievement of good water status, as amended – the latest amendment as Government Ordinance No. 359/2022 Coll.,*
 - Government Ordinance No. 234/2015 Coll. on making available simple pressure vessels on the market.
 - Government Ordinance No. 1/2016 Coll. on making available pressure equipment on the market.
 - Government Ordinance No. 127/2016 Coll. on electromagnetic compatibility – last amendment Government Ordinance No. 331/2019 Coll.
 - Government Ordinance No. 148/2016 Coll. on making available electrical equipment intended for use within certain voltage limits on the market – last amendment Government Ordinance No. 325/2019 Coll.
 - Government Ordinance No. 149/2016 Coll. on equipment and protective systems intended for use in potentially explosive atmospheres – *last amendment Government Ordinance No. 333/2019 Coll.*
 - Government Ordinance No. 117/2018 Coll., which repeals the Government Ordinance No. 35/2008 Coll. laying down the details of technical requirements and conformity assessment procedures for personal protective equipment.
 - *Government Ordinance No. 21/2019 Coll., laying down the amount of the annual levy intended for the payment of historical debt from the supplied electricity to end customers, and details on the method of its collection for the National Nuclear Fund, its use and on the method and due dates for tis payment.*
 - *Government Ordinance No. 478/2022 Coll., setting the amount of mandatory contribution and the mandatory payment, and the details of the method of collection and payment of the mandatory contribution and mandatory payment to the account of the National Nuclear Fund.*
 - *MH SR Decree No. 31/2019 Coll., laying down details on the structure and scope of eligible costs, rules for price setting and price updates for own deliveries of the beneficiary of funds from the National Nuclear Fund and the structure and scope of price calculation of own deliveries.*
 - MPSVR SR Decree No. 508/2009 Coll. laying down the details for ensuring occupational health and safety for working with pressure, lifting, electric and gas technical equipment and determining

technical equipment considered as classified technical equipment – as amended by MPSVR SR Decree No. 234/2014 Coll.

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- MZ SR Decree No. 98/2018 Coll. on the limitation of exposure of workers and residents from natural sources of ionizing radiation.
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- MZ SR Decree No. 101/2018 Coll., laying down details of the provision of radiation protection in medical exposure – last amendment MZ SR Decree No. 340/2019 Coll.
- *MZ SR Decree No. 91/2023 Coll., establishing drinking water and hot water quality indicators and limit values, drinking water monitoring procedure, risk management of drinking water supply systems and risk management of domestic water distribution systems.*
- MŽP SR Decree No. 453/2000 Coll. implementing certain provisions of the Construction Act – *effective until 31 March 2025.*
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- ÚJD SR Decree No. 51/2006 Coll. laying down the details on the requirements for ensuring physical protection.

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- ÚJD SR Decree No. 52/2006 Coll. on professional competence as amended by ÚJD SR Decree No. 355/2023 Coll.
 - ÚJD SR Decree No. 54/2006 Coll. on registration and control of nuclear materials and on notification of selected activities.
 - ÚJD SR Decree No. 55/2006 Coll. on the details in emergency planning for the case of incident or accident as amended by ÚJD SR Decree No. 9/2018 Coll – *last amendment ÚJD SR Decree No. 310/2022 Coll.*
 - ÚJD SR Decree No. 57/2006 Coll. laying down the details on the requirements during transportation of radioactive materials – the latest amendment ÚJD SR Decree No. 105/2016 Coll.
 - ÚJD SR Decree No. 58/2006 Coll. laying down the details of the scope, content and the method of preparation of documentation of nuclear installations necessary for individual decisions as amended by ÚJD SR Decree No. 155/2022 Coll.
 - ÚJD SR Decree No. 430/2011 Coll. on requirements for nuclear safety – as amended by ÚJD SR Decree No. 103/2016 Coll.
 - ÚJD SR Decree No. 431/2011 Coll. on quality management system – as amended by ÚJD SR Decree No. 154/2022 Coll.
 - ÚJD SR Decree No. 30/2012 Coll. laying down the details on the requirements for nuclear materials, radioactive waste and spent nuclear fuel management – as amended by ÚJD SR Decree No. 101/2016 Coll.
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 - *Council Regulation (Euratom) 2021/100 of 25 January 2021 establishing a dedicated financing programme for the decommissioning of nuclear facilities and the management of radioactive waste and repealing Regulation (Euratom) No. 1368/2013*
 - *Regulation (EU) 2021/821 of the European Parliament and of the Council of 20 May 2021 setting up a Union regime for the control of exports, brokering, technical assistance, transit and transfer of dual-use items*
 - *Council Regulation (Euratom) 2021/948 of 27 May 2021 establishing a European Instrument for International Nuclear Safety Cooperation complementing the Neighbourhood, Development and International Cooperation Instrument - Global Europe under the Treaty establishing the European Atomic Energy Community and repealing Regulation (Euratom) No. 237/2014*
 - *Commission Delegated Regulation (EU) 2022/1 of 20 October 2021 amending Regulation (EC) 2021/821 of the European Parliament and of the Council as regards the list of dual-use items*
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 - Directive 62/302/EC of 5 March 1962 on freedom to take skilled employment in nuclear energy, *O.J. EU chap. 5/zv. 1; O.J. EC 57, 9 July 1962*.

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 - Council Directive 2011/70/Euratom of 19 July 2011 establishing the Community framework for the responsible and safe management of spent fuel and radioactive waste, *O.J. EU L 199, 2 August 2011*.
 - Directive of the European Parliament and the Council 2012/18/EU of 4 July 2012 on the control of major accident hazards involving dangerous substances, amending and subsequently repealing Council Directive 96/82/EC, *O.J. EU L 197, 24 July 2012*.
 - Council Directive 2013/59/Euratom of 5 December 2013 laying down basic safety standards for protection against dangers arising from ionizing radiation, repealing Directives 89/618/Euratom, 90/641/Euratom, 96/29/Euratom, 97/43/Euratom and 2003/122/Euratom, *O.J. EU L 13, 17 January 2014*.
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 - Commission Recommendation 2006/851/Euratom of 24 October 2006 on the management of funds for the decommissioning of nuclear installations and the management of spent fuel and radioactive waste, *O.J. EU L 330, 28 November 2006*.
 - Commission Recommendation 2008/956/Euratom of 4 December 2008 on the criteria for exports of radioactive waste and spent nuclear fuel to third countries, *O.J. EU L 338, 17 December 2008*.
 - Commission Recommendation 2009/120/Euratom of 11 February 2009 on implementation of accounting and record keeping and control of nuclear materials by the operators of nuclear installations, *O.J. EU L 41, 12 February 2009*.
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- Council Decision 2013/434/EU of 15 July 2013 authorizing certain Member States to ratify, in the interest of the European Union, the Protocol amending the Vienna Convention on Civil Liability for Damage caused by the nuclear event of 21 May 1963 or to accede to it and make a declaration on the application of the relevant internal rules of the Union law, O.J. EU L 220, 17 August 2013.

List of ÚJD SR Safety Guides

- BNS III.4.3/2000 Requirements on assessment for fuel loading.
- BNS I.8.1/2005 Specification on the scope of Preliminary plan of physical protection and Plan of physical protection in line with the Decree 186/1999 Coll. laying down the details concerning physical protection of nuclear installations, nuclear materials and radioactive waste.
- BNS I.2.5/2005 Requirements of ÚJD SR on chap. 16 of the Pre-operational safety report "Limits and Conditions".
- BNS II.1.1/2008 Registration and control of nuclear materials.
- BNS II.5.4/2009 Qualification of systems for non-destructive test in nuclear power engineering. Requirements and instructions.
- BNS II.5.6/2009 Rules on design, manufacturing, assembly, repairs, replacements and reconstruction of mechanical and technological components of classified equipment of WWER 440 nuclear power plants.
- BNS II.5.5/2009 Examining of mechanical properties, chemical composition a selected characteristics of resistance of material and welded joints against rupture under limit load conditions of mechanical and technological components of equipment of WWER 440 nuclear power plants.
- BNS II.3.3/2011 Metallurgical products and spare parts for nuclear installations. Requirements.
- BNS II.5.3/2011 Welding materials for welding mechanical-technology components of nuclear power plants. Technical requirements and selection rules.
- BNS II.5.2/2012 Control of welding and quality of welds of components of classified equipment of nuclear power plants. Requirements.
- BNS II.5.1/2012 Welding of nuclear equipment. Basic requirements and rules.
- BNS II.3.1/2016 Evaluation of the permissibility of errors detected during operational inspections of selected equipment of nuclear installations.
- BNS II.3.4/2016 Rules for the design, manufacture and operation of systems monitoring degradation of safety relevant components of NI Part 1. Corrosion monitoring.
- BNS II.3.5/2016 Rules for the design, manufacture and operation of systems monitoring degradation of safety relevant components of NI Part 2. Monitoring of thermal aging processes of structural materials of NI.

- BNS II.3.6/2016 Rules for the design, manufacture and operation of systems monitoring degradation 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 NIs.
- BNS II.9.2/2016 Evaluation of mechanical characteristics of materials operated by selected mechanical engineering devices using SPT methodology.
- BNS I.9.4/2017 Requirements for the recording of data relevant for the decommissioning of nuclear installation.
- BNS I.9.3/2017 Requirements for the content and extent of the documentation for decommissioning, submitted as part of the application in the proceeding for approval pursuant to Section 5 par. 2 of the Atomic Act, and in the proceeding for granting authorization pursuant to Section 5 par. 3 a) to d) of the Atomic Act.
- BNS I.9.5/2017 Requirements for safety analyses of activities performed during decommissioning of nuclear installations
- BN 1/2019 Requirements for quality assurance of software for safety analyses (4th edition – revised and supplemented)
- BN 2/2019 Single failure criterion (3rd edition – revised and supplemented)
- BN 3/2019 Requirements for reactor description and its design basis in the safety report (4th edition – revised and supplemented)
- BN 4/2019 Requirements for performing and evaluating results of self-assessment of nuclear physical safety culture
- BN 5/2019 Requirements for deterministic safety analyses of NIs with VVER-440/V213 (6th edition – revised and supplemented)
- BN 1/2020 Comprehensive periodic nuclear safety review (3rd edition – revised and supplemented)
- BN 2/2020 Requirements for ensuring fire protection and fire safety of nuclear installations in terms of nuclear safety (4th edition – revised and supplemented)
- BN 3/2020 Requirements for the development, implementation and evaluation of the results of the physical tests of the re-start program (3rd edition – revised and supplemented)
- *BN 1/2022 Nuclear Safety Glossary of ÚJD SR (2nd edition – revised and supplemented)*
- *BN 2/2022 Security requirements for nuclear installations in relation to internal threats*
- *BN 3/2022 Security requirements for nuclear installations in relation to external threats (2nd edition – revised and supplemented)*
- *BN 4/2022 Requirements for PSA (4th edition – revised and supplemented)*

- *BN 5/2022 Scope and content of safety analysis report (3rd edition – revised and supplemented)*
- *BN 1/2023 Reporting, investigation of causes and assessment of operational incidents at nuclear installations*
- *BN 2/2023 Ageing management and long-term operation of NPPs (3rd edition – revised and supplemented)*

Annex VII. List of International Experts Reports and Safety Reports

Tab. 1. List of safety documentation and of international missions focusing on safety of NI for spent fuel and RAW management in SR:

NI	Preceding documentation	Pre-operational Safety Report/Decommissioning stage Plan	Periodical assessment	International missions
NPP A1 Bohunice	EIA in the framework of decommissioning A1 12/2000 EIA after completion of stage I 10/2003 EIA stage III and IV of decommissioning of NPP A1 11/2015 <i>EIA for stage V of decommissioning of NPP A1 since 2022</i>	Plan for 2 nd stage of decommissioning - 2008 Plan for 3 rd and 4 th stages of decommissioning – 2016 <i>Plan for 5th stage of decommissioning – 5/2024</i>	1980, 1992, 1995-98 2007 2016 2024	
NPP V1 Bohunice	EIA for the decommissioning EIA stage II of decommissioning of NPP V1 Bohunice 06/2014	Plan for the 1 st stage of decommissioning - 06/2011 Plan for the 2 nd stage of decommissioning - 2015	07/2009 06/2014	
ISFS Bohunice	Preliminary Safety Report (reconstr. 1997) EIA 02/2016	1987, 09/1998 04/2010 03/2014	11/2008 11/2018	
TSÚ RAO Bohunice	BSC Bohunice Reference Safety Report, EIA (pre BSC), EIA TSÚ RAO 11/2014	1987, 9/1998	2000 (after reconstruction))	
	Preliminary Safety Report, EIA (for BSC) EIA TSÚ RAO 11/2014 11/2014	1998 (pre BL 1994, 2002) 08/2010 10/2017 07/2018	05/2009 01/2019	
FS KRAO Mochovce	Preliminary Safety Report 2004 EIA FS KRAO Mochovce 07/2014	07/2006 12/2017	10/2015	
Integral Storage Bohunice	Intent 2011 EIA IS Bohunice 09/2012 Preliminary Safety Report 2015	12/2017		

RÚ RAO Mochovce	Reference and Preliminary Safety Report EIA RÚ RAO 05/2013	4/1999 10/2014 10/2015 01/2017 07/2018	04/2011	WATRP 1995
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Safety Reports and evaluation documents from missions at NI for the SNF and RAW management in the Slovak Republic:

1. NPP V1 Safety Report after gradual reconstruction 05/2001
2. Pre-operational Safety Report for the National RAW Repository 04/1999
3. Pre-operational Safety Report – shipments of solid RAW in ISO containers 01/2000
4. Pre-operational Safety Report – re-qualified fragmentation facility for treatment of metal RAW with surface contamination do 3000 Bq/cm² 04/2001
5. Pre-operational Safety Report for the ISFS 09/1998
6. WENRA: Nuclear Safety in EU Candidate Countries 10/2000
7. IAEA: Review of Results of the Gradual Upgrading at Bohunice WWER-440/230 NPP Units 1 and 2 11/2000
8. Licensing Related Assessment of Design and Operational Safety for VVER 213 (PHARE/SK/TSO/VVER03) 12/1999
9. Report on Nuclear Safety in the Context of Enlargement (9181/01) 05/2001
10. International Conference on the Strengthening of Nuclear Safety in Eastern Europe – IAEA Report 06/1999
11. Final Report of the IAEA EBP and other Related IAEA Activities on the Safety of WWER and RBMK NPPs 1998
12. 5-BSP-001 Safety Report of NPP V1 after gradual reconstruction 11/2000
13. A-01/A1 Safety Report of NPP A1 - current status 11/2005
14. *Pre-operational Safety Report of FS KRAO Mochovce* 07/2006
15. Technical Report – Periodic Safety Review of NPP A1 after stage 1 of decommissioning 10/2007
16. *Technical Report - Periodic Safety Review of ISFS* 12/2009
17. *Technical Report – Periodic Safety Review of NPP V1 – Report No JAVYS/PHJB - V1/ZS/2009* 12/2009
18. *JAVYS/PHJB-V1/ZS/2009 Technical Report –* 12/2009

Periodic Safety Review NPP V1

19. 5-BSP-001 Pre-operational Safety Report for NPP V1	03/2010
20. A-01/MSVP Pre-operational Safety Report for ISFS	04/2010
21. A-01/TSÚ RAO Pre-operational Safety Report for TSÚ RAO at Jaslovské Bohunice	08/2010
22. Technical Report – Periodic Safety Review of RÚ RAO	04/2011
23. A-01/RÚ RAO Pre-operational Safety Report of RÚ RAO Mochovce	09/2011
24. 13-BSP-001 Pre-operational Safety Report for ISFS at Jaslovské Bohunice	03/2014
25. B6.5-D12-6 Report on periodic safety review of NPP V1 after stage 1 of decommissioning	06/2014
26. 12-BSP-001: Pre-operational Safety Report for RÚ RAO Mochovce	10/2014
27. 12-BSP-001: Pre-operational Safety Report for RÚ RAO Mochovce	10/2015
28. Technical Report - Periodic Safety Review of FS KRAO	10/2015
29. 12-BSP-001: Pre-operational Safety Report for RÚ RAO Mochovce	01/2017
30. 10-BSP-001 Pre-operational Safety Report for TSÚ RAO Bohunice	10/2017
31. 11-BSP-001 Pre-operational Safety Report for FS KRAO	12/2017
32. 16-BSP-001 Pre-operational Safety Report for IS RAO at the Bohunice site	12/2017
33. 10-BSP-001 Pre-operational Safety Report for TSÚ RAO Bohunice	07/2018
34. 12-BSP-001: Pre-operational Safety Report for RÚ RAO Mochovce	07/2018
35. Technical Report – Final Report on Periodic Safety Review of ISFS	11/2019
36. Technical Report - Final Report on Periodic Safety Review of TSÚ RAO	01/2020

Documentation submitted by the Slovak Republic to fulfil Article 37 of the Euratom Treaty as interpreted by the COMMISSION RECOMMENDATION of 6 December 1999 on the application of Article 37 of the Euratom Treaty (notified under document number C (1999) 3932) (1999/829/Euratom), published on 16 December 1999 in the Official Journal of the European Communities, No. L 324:

- Technologies for RAW treatment and conditioning at the Jaslovské Bohunice site;
- Integral RAW storage facility at Jaslovské Bohunice site;
- Decommissioning of nuclear power plant A1 (stage 1);
- Decommissioning of nuclear power plant A1 (stage 2);
- Decommissioning of nuclear power plant V1 (stage 1);

- Completion of the second double row and construction of the third double row of the National RAW Repository in Mochovce;
- Construction of a Repository for very low-activity RAW at the National Repository in Mochovce;
- Decommissioning of nuclear power plant A1 (stage 3 and 4).

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