

National Nuclear Fund for decommissioning of the nuclear installations
and for handling of spent nuclear fuel and radioactive wastes

PROPOSAL

**FOR NATIONAL POLICY
AND
NATIONAL PROGRAMME**

**FOR HANDLING OF SPENT NUCLEAR FUEL AND
RADIOACTIVE WASTES IN SR**

**IN FORM OF UPDATED STRATEGIC DOCUMENT
THE STRATEGY FOR THE FINAL STAGE OF PEACEFUL
UTILIZATION OF NUCLEAR POWER ENGINEERING IN SR**

National Nuclear Fund for decommissioning of the nuclear installations
and for handling of spent nuclear fuel and radioactive wastes

**THE NATIONAL POLICY
FOR HANDLING OF SPENT NUCLEAR FUEL
AND RADIOACTIVE WASTES IN SR**

The National Policy for handling of Spent Nuclear Fuel and Radioactive Wastes in The Slovak Republic

Pursuant to § 3a The National Policy and The National Programme the Act No. 238/2006 Coll. on The National Nuclear Fund for decommissioning of the nuclear installations and for handling of spent nuclear fuel and radioactive wastes (the Nuclear Fund Act) and on alteration and amendments other acts according to the Acts: the Act No. 528/2006 Coll., the Act No. 94/2007 Coll., the Act No. 408/2008 Coll., the Act No. 143/2010 Coll., the Act No. 550/2011 Coll., the Act No. 391/2012 Coll. and the Act No. 143/2013 Coll.

The Board of Governors of The National Nuclear Fund for decommissioning of the nuclear installations and for handling of spent nuclear fuel and radioactive wastes (hereinafter referred to as “NJF“) develops in cooperation with legal person pursuant to special regulation and with holders of approval or permit issued by The Nuclear Regulatory Authority (hereinafter referred to as „The Authority“)

- a) Proposal of The National Policy for handling of spent nuclear fuel and radioactive wastes (hereinafter referred to as „The National Policy“) and
- b) Proposal of The National Programme for implementing of The National Policy (hereinafter referred to as „The National Programme“).

The National Policy is found on following policies:

- a) The Slovak Republic shall bear final responsibility for decommissioning of the nuclear installations at the territory of SR, for safe and responsible long-term storage and disposal of spent nuclear fuel and for handling of radioactive waste, which will be produced at its territory after its release by producer by expiring 12 month period from its generation,
- b) final responsibility for safe and responsible disposal of radioactive waste or spent nuclear fuel, which will be transported from the The Slovak Republic for conditioning or processing to member state of The European Union or the third state included any waste, which will be produced as a by-product of conditioning or processing shall be borne by The Slovak Republic bound by international treaty subject to the provisions,
- c) generation of radioactive waste from the viewpoint of its activity and volume is maintained at the lowest possible achievable level through appropriate project measures and operational procedures and decommissioning procedures included preprocessing and reuse of materials,
- d) in all steps of spent nuclear fuel and radioactive waste handling mutual interdependencies are considered,
- e) spent nuclear fuel and radioactive waste handling must be safe from long-term viewpoint also, when especially passive safety features are applied,
- f) in spent nuclear fuel and radioactive waste handling graded approach is applied especially considering activity, amount, type of nuclear facility in which handling is executed and other dangerous characteristics,
- g) costs for spent nuclear fuel and radioactive waste handling shall be borne by producer, who produced them, in case of unknown originator relevant measures are adopted,
- h) documentation of decision making process is based on evidence and characterization results in all stages for handling of VJP and RAO.

The Board of Governors submits to the Ministry of Economy of SR (hereinafter referred to as „MH SR“) „The Proposal for The National Policy and The Proposal of The National Programme and proposal of their updates with The Authority Opinion included in six year intervals. The National Policy and The National Programme in addition to handling of spent nuclear fuel and radioactive waste include other activities connected to the final stage of nuclear power engineering in SR with decommissioning of nuclear facilities included. MH SR submits The Proposal for The National Policy and The National Programme to the Government for approval. MH SR submits The National Policy and The National Programme approved by the Government to The European Union first time up to August 23, 2015, in cooperation with The Authority and NJF provides also necessary explanations in period of 6 months from requirement of EU and informs about any change made in The National Policy and The National Programme.

The Board of Governors of NJF develops in cooperation with legal person pursuant to special regulation and holders of approval or permit Report on implementation of The National Programme once per year for previous year and submits it to the MH SR for approval together with the Opinion of the Authority.

Objectives of The National Policy of The Slovak Republic in fields for handling of spent nuclear fuel and radioactive wastes

The Slovak Republic did not in past explicitly formulate and politically approve policy for handling of radioactive wastes and spent nuclear fuel. Policies for formulation of national policy are stated in section 2 of § 3a of the Act No. 238/2006 Coll. on National Nuclear Fund. There are paragraphs in the approved Strategy for the final stage of peaceful utilization of nuclear power engineering in The Slovak Republic concerning aspects, which may be considered more of policy than strategy – National Programme.

In further text there such aspects together with policies formulated pursuant to section 2 of § 3a of the Act No. 238/2006 Coll. on National Nuclear Fund will be identified in provisions of legislative regulations and in practice of handling of radioactive wastes and spent nuclear fuel. Solutions applicable to them are proposed to be overall objectives of national policy. There are following objectives:

1. Safe and reliable decommissioning of nuclear installations.
2. Minimization of wastes.
3. Selection of appropriate fuel cycle.
4. Safe storage.
5. Safe execution in handling of radioactive wastes.
6. Solution for nuclear safety.
7. Applying of graded approach.
8. Principle „polluter pays“.
9. Objective decision making process.
10. Responsibility.

1. Safe and reliable decommissioning of nuclear installations.

Every nuclear installation in The Slovak Republic after termination of operation is safely decommissioned from operation. An exception from the rule represents Republic Repository, which by its character does not conform to this rule but it is closed after termination of operation and institutional control is executed there. There are ten nuclear installations in two sites in The Slovak Republic in present and other two are in preparation period, which are or will be gradually in the process of decommissioning. This spectrum includes nuclear power plants and non-reactor nuclear facilities for handling of radioactive wastes and spent nuclear fuel. In present decommissioning of two nuclear power plants and two experimental facilities for handling of radioactive wastes are in process. Decommissioning of further non-reactor nuclear facilities is connected with operation and decommissioning of nuclear power plants and is assumed after termination of decommissioning thereof. For conditioning and processing of radioactive wastes from non-reactor facilities mobile equipment will be used in decommissioning. Last step in life cycle of nuclear installations is point when they are excluded from jurisdiction of the Nuclear Act No. 541/2004 Coll. on peaceful utilization of nuclear power engineering (The Atomic Act) and on alteration and amendments of other Acts.

Safe and reliable decommissioning of nuclear installations in The Slovak Republic is achieved throughout application of legislative requirements and also corresponding license and inspection processes provided for in the Atomic Act and its implementing regulations. Every nuclear installation has developed documentation on form of decommissioning since period of placement. Conceptual plans for decommissioning are elaborated in three options. In addition to so called zero option there is immediate continual decommissioning option and option for postponed beginning of decommissioning – protective closing of hermetic compartments for period of 30 years. Only one option is considered to be accepted in present time – immediate continual decommissioning option.

2. Minimization of wastes

Considerable attention has been paid to minimization of amounts and activity of radioactive waste already at its generation and then during every steps further handling thereof. Generation of radioactive waste and its handling must be governed by technical and organizational measures in order to maintain its amounts and activity at lowest possible reasonably achievable level. Plans for handling of radioactive wastes included in license documentation contain procedures of appropriate collection and classification for every kind of generated radioactive wastes, optimal method and fixation matrix used at process of conditioning and processing and also proposal of its optimal composition of resulting packed form for disposal. Optimization procedures in this context range within two extreme limits:

- minimization exclusively from aspect of quantity of radioactive wastes – this would result to increasing of activity of wastes, what would further result to wastes generation not disposable in Surface Repository in Mochovce.
- conditioning of activity of radioactive wastes in their final packed form in order to achieve status for disposal in Surface Repository in Mochovce (i. e. packed form fulfills criteria for acceptance/limits and conditions for safe operation)

Criteria allowing unconditional release of materials into environment are elaborated. Further possibilities for management of minimization of radioactive wastes in The Slovak

Republic would in long term result in introduction of „de minimis“ criterion proof, i. e. application of conditional release from under control.

From storage point of view there are possibilities developed for minimization by application of so called extinction for class of temporary radioactive wastes. Minimization aspects are respected in disposal by separation of disposal for very low-level and low-level radioactive wastes.

Within commissioning of nuclear installation for operation and during operation of nuclear installation it is important to hand over radioactive wastes and spent nuclear fuel immediately after fulfilling criteria for its safe transport and storage to legal person assigned by state, what prevents their unreasonable accumulation at producer site. Equivalent provisions are also in effect in The Slovak Republic for handling of institutional radioactive wastes.

Minimization of wastes in The Slovak Republic is achieved throughout application of legislative requirements and also corresponding license and inspection processes provided for in the Atomic Act, implementing regulations and legislative framework for field of radiation protection.

3. Selection of appropriate fuel cycle

Objectives of policy for fuel cycle in present in The Slovak Republic are formulated as follows:

- **Open fuel cycle:** operation of nuclear reactors is and henceforth will be in so called open fuel cycle (in present it is not possible to apply closed fuel cycle as VVER-440 operated or in construction are not licensed in The Slovak Republic for use of nuclear fuel of MOX type).
- **It is not possible to export of spent nuclear fuel without return of radioactive wastes:** all international politically declared endeavors and initiatives, which would introduce system similar to one worked in „socialist camp“ before mentioned geopolitical changes have been put an end in deadlock for the moment; consequently export of spent nuclear fuel without return of wastes from reprocessing has been skipped from strategic considerations in the field for the moment.
- **Reprocessing of spent nuclear fuel is not considered in present** – i. e. transport abroad and with following import of reprocessed products back. Costs for reprocessing are not compensated for savings considering necessary handling of returning high-level wastes from reprocessing up to their safe disposal in deep geological disposal. In case reprocessing in future will be demonstrated as profitable and advisable it will be needed to ensure on behalf of cost minimization of wastes that originator of such spent nuclear fuel could execute reprocessing within own costs. In such case this scenario will be revalued.
- **Performance of so called scenario of double path** for the final stage for handling of spent nuclear fuel specifically:
 - development of Slovak deep geological repository for direct disposal of spent nuclear fuel and radioactive wastes inappropriate for disposal in Republic Repository in Mochovce,
 - participation in activities, which would lead to international deep repository, i. e. repository owned and operated jointly by more states based on

relevant international agreements; it is expected economical and other advantages of this solution for the final stage for handling of spent nuclear fuel will overcome finally geopolitical and social barriers, which have prevented practical implementation of this solution for the moment, whereby depending on development in both solutions decision on which path to implement finally will be accepted and periodically revalued.

- **Retrievability of disposed spent nuclear fuel and radioactive wastes from deep repository:** in regard to state of development in the field of the final stage for handling of spent nuclear fuel The Slovak Republic will deal with this topic within above mentioned scenarios.
- **Building of adequate storage capacities:** The Slovak Republic shall build adequate storage capacities in order to enable safe and long term storage of spent nuclear fuel in time and space (also radioactive wastes not disposable in existing repository) up to period of operation of appropriate repository.
- **Support of participation at international scientific-research programmes and projects in the field of the final stage of fuel cycle.**
- **Following of development and relevant aspects:** future decision will reflect at all levels technical and legislative development taking place in world and in the European Union and other for example social and economical aspects i. e. it will be revalued in appropriate intervals with possibility to return in step sequence back in order to reflect the development.

4. Safe storage

Storage of spent nuclear fuel and radioactive wastes even in long term is not considered for disposal alternative in The Slovak Republic. Consequently, legislative framework is formed in The Slovak Republic for safe storage of radioactive wastes and spent nuclear fuel in facilities of its generation, providing conditions for assurance of nuclear safety and radiation protection and relevant time limits.

Central storages represent an interim step in sequence for handling of spent nuclear fuel and radioactive wastes:

- **Integral storage** in Jaslovské Bohunice. Construction of storage is in progress in present. It will be assigned to storage of solid and /or solidified wastes basically from decommissioning before their final disposal or before conditioning precedent to future final disposal.
- **Storage for IRAO/ZRAM** in vicinity of Republic Repository site for radioactive wastes in Mochovce. Centralized collection of IRAO ensures legal person assigned by state.
- **Interim storage for spent nuclear fuel in Jaslovské Bohunice**, which after seismic reinforcement and compacting enables to store spent nuclear fuel for decades.
- Preparation for capacity expansion for **VJP** storage will grant definite solution for capacity needs.

5. Assurance for handling of radioactive wastes

Conditionality follow up for handling with radioactive wastes is based on acceptance criteria of packed forms of wastes for disposal. Acceptance criteria pursuant to legislative regulations for nuclear installations form basic element of „limits and conditions for safe operation“ of repository. Legislative framework, operational directives, resulting practice of originators of radioactive wastes and a subject implementing further handling with wastes ensure that accompanying letter follows all individual stages for their handling, in which all safety information for – immediate, short term and long term – affecting all following stages is recorded.

- **Radioactive wastes disposable in the Republic Repository of radioactive wastes in Mochovce:** above principle and existing practice for such wastes are fully implemented.
- **Radioactive wastes not disposable** in the Republic Repository for radioactive wastes in Mochovce: it is assumed the same approach will be applicable also for such radioactive wastes. Handling of such wastes emerges from the need of their storage up to the time when appropriate repository from nuclear safety viewpoint will be available for them. In the process for handling of them it is important for this purpose to maintain the flexibility of packed form corresponding to generic requirements to the maximum extent possible.
- **IRAO:** above approaches are applicable in principle also for handling of IRAO and ZRAM, which will be disposed in The Slovak Republic by the same subject together with wastes from operation and decommissioning from nuclear installation.

6. Assurance of nuclear safety

All activities for handling of radioactive wastes and also for handling of spent nuclear fuel (in case they are considered to be radioactive waste) are directed toward their safe disposal.

In relation to disposal as final step of this process, long term safety of repositories is achieved through passive safety systems, what fulfills one of principles for safe handling of radioactive wastes: to avoid undue burden for future generations.

The Slovak Republic established and deployed fully operating legislative system requirements enables to achieve high level of nuclear safety for handling of radioactive wastes and spent nuclear fuel. This system is in accordance with recommendations of International Atomic Energy Agency (IAEA), European Nuclear Regulators Association (ENRA) and other international organizations. Safety requirements are applied to facilities and also to activities themselves and demonstration of compliance with requirements is a condition for relevant license issue for each stage of life cycle of nuclear facility from placement up to the release from under control.

7. Application of graded approach

Legislative regulations and implementing procedures thereof differentiate the approach to safety of nuclear facilities for handling of radioactive wastes and spent nuclear fuel from the approach to safety of nuclear power plants for example. Graded approach to safety is also applied throughout various periods of existence of nuclear power plants within life cycle (differences are in safety requirements for nuclear facilities during construction, nuclear facilities in operation, eventually in stage of their decommissioning). Safety legislative provisions in force are generally designed for any nuclear installation, whereby in particular notions they referred to differences specifically for particular type of nuclear installation. Such differences describe the possibility specifically for achievement for critical status, inventory of RAO and VJP, which are treated in relevant installation and so on. The principle of graded approach is applied in formulation of safety requirements for project for particular nuclear installation as well as in its safety review process. Regulation on Nuclear Safety representing one of essential regulations in this field is based on the same principle. Further specification of measures of the graded approach is given throughout recommendations in non-binding publications of regulator at the level of safety guides.

8. The principle „polluter pays“

It concerns basic principle, on which all system for financing for activities of the final stage of peaceful utilization of nuclear energy is built. Implementation is secured:

- contractually producent of radioactive wastes and their processor in case of radioactive wastes from operation,
- pursuant to the Act on NJF for radioactive wastes from decommissioning.

Financing system for activities of the final stage of peaceful utilization in addition to the principle „polluter pays“ is governed also by principles of proportionality, non-discrimination, transparency, efficiency, reasonable appreciation, adequate resources.

9. Objective decision making

Transparent decision making process based on evidence and its appropriate documentation is one of principles of Slovak politics for decommissioning of nuclear installations and handling for radioactive wastes and spent nuclear fuel. Basic instruments of making decision process in SR more objective are transparency, environmental impact assessment process (EIA), information to the public and public participation in decision making in accordance with applicable law.

10. Responsibility

The Slovak Republic assumes final responsibility for handling of spent nuclear fuel and radioactive wastes produced at its territory.

Final responsibility for safe and responsible disposal of radioactive waste or spent nuclear fuel, which will be transported from the The Slovak Republic for conditioning or processing to member state of The European Union or the third state included any waste, which will be produced as a by-product of conditioning or processing shall be borne by The Slovak Republic bound by international treaty subject to the provisions.

These general principles, on which national policy is based on, are from the viewpoint of need for more focus and detail definition of relationships in form of legislative regulations in the field of nuclear safety and radiation protection further defined as follows:

- Originator of radioactive wastes bears responsibility for implementation of safe handling of radioactive wastes in accordance with The National Programme up to their receipt to repository and holder of permit for handling of radioactive wastes bears responsibility for safety of facilities for handling of radioactive wastes.
- Holder of permit for commissioning, operation and decommissioning bears responsibility for safety aspects of nuclear installation including radioactive waste handled there. If holder of the permit handles in nuclear facility for radioactive wastes originated in nuclear facility to which other person holds the permit, responsibility for radioactive wastes in facility in which it is handled shall be determined between both holders of permit in every step of handling of radioactive wastes.
- IRAO and unused radioactive sources shall be transmitted to competent organization for further handling of them as late as up to 12 months from its origin in case of IRAO, eventually from termination of its use in case of radioactive sources.
- Holder of the permit, who produced it, is responsible for handling of spent nuclear fuel up to its transmission to repository.
- In view of implementation of nuclear safety and avoiding unreasonable accumulation of radioactive wastes and spent nuclear fuel, holder of the permit is obliged in commissioning of nuclear installation and during operation of nuclear installation to transmit radioactive wastes as late as up to 12 months from its origin and spent nuclear fuel immediately after meeting requirements for its safe transport and storage to legal person authorized for further handling of them.
- Responsibility for disposal of radioactive wastes and spent nuclear fuel rests in legal person founded, established or authorized by The Ministry of Economy of The Slovak Republic, which shall be holder of the permit for operation of repository, The Slovak Republic shall own 100% of it and must not be at the same time holder of the permit for operation of nuclear facility with reactor.

In relation to decommissioning The Slovak Republic assumes final responsibility for decommissioning of all nuclear installations at its territory. This responsibility is implemented in following manner:

- throughout duties against holder of the license for operation of relevant nuclear facility, which is obliged to implement its decommissioning and will become holder for the license for this decommissioning itself or through other person, which based on contract with the holder of the license for operation of relevant nuclear facility will become holder of the license for its decommissioning.