NOTIFICATION OF CHANGE IN THE PROPOSED ACTIVITY in accordance with Section 18, par. 4 of Act No. 24/2006 Coll. on environmental impact assessment and on changes and amendments to certain acts, as amended	
I. Details of the Petitioner	
1. Trade name:	Jadrová a vyraďovacia spoločnosť, a.s.
2. ID:	35946024
3. Registered office:	Tomášikova 22, 821 02 Bratislava
4. Name, surname, address, telephone number and other contact data of the Petitioner's authorized representative.	Ing. Peter Čižnár – Chairman of the Board of Directors and Chief Executive Officer, Tomášikova 22, Bratislava 821 02 Tel.: 033/531 5340 Ing. Ján Horváth – Member of the Board of Directors and Safety Division Director Tomášikova 22, Bratislava 821 02 Tel.: 033/531 5710 Ing. Miroslav Božik, PhD. A1 Decommissioning and RAW and SNF Management Division Director Tomášikova 22, Bratislava 821 02 Tel.: 033/531 5232
5. Name, surname, address, telephone number and other contact data of the liaison having available relevant information of the proposed activities and the lace for consulting.	Ing. Branislav Mihály – Radiation protection, Environment and Chemistry Section Head Tomášikova 22, Bratislava 821 02 Tel.: 033/531 6528 e-mail: mihaly.branislav@javys.sk Ing. Daniel Vašina – Project Engineer - A1 Decommissioning Strategy Tomášikova 22, Bratislava 821 02 Tel.: 033/531 6232 e-mail: vasina.daniel@javys.sk
II. Description of the proposed activity	
Completion of the spent nuclear fuel storage facility at Jaslovské Bohunice location	
III. Details of the change in the proposed activity	
1. Location of the proposed activity (region, district, municipality, cadastral area, lot No.): In Jaslovské Bohunice, Jadrová a vyraďovacia spoločnosť, a.s. operates facility No. 840 "Interim Spent Fuel Storage Facility" (hereinafter only the "ISFF") – a nuclear facility used for storage of spent nuclear fuel from the decommissioned V1 NPP and the presently operated nuclear power plants in the Slovak Republic. Location of the nuclear facility: - Region: Trnava - District: Trnava - Municipality: Jaslovské Bohunice - Cadastral area: Bohunice - Lot No. 701/50. The facility is located in the site of JAVYS, a.s., Jaslovské Bohunice location, and is classified at the highest physical protection level.	

2. *Brief description of technical and technological solution including required inputs (land occupation requirements, water use, other raw material and energy resources, transportation and other infrastructure, labour requirements, other requirements) and details on outputs (such as sources of air pollution, sewage water, other waste, sources of noise, vibrations, radiation, heat and smelliness, other expected impacts, such as induced investments).*

The notification of change in the proposed activity describes the prepared changes in the existing activities – expansion of spent nuclear fuel (SNF) storage facilities in Jaslovské Bohunice.
The petitioner Jadrová a vyraďovacia spoločnosť, a.s. seated at Tomášikova 22, 821 02 Bratislava, as the operator of the nuclear facility for spent nuclear fuel storage proposes construction of the SNF storage facility for at least 18 600 fuel assemblies. The construction of the storage facility is scheduled for implementation in two phases with the first phase involving expansion of the storage capacity by at least 10 100 SNF assemblies and in the second phase it will be expanded by at least 8 500 SNF assemblies.
Under Section 3, par. 9 of Act No. 541/2004 Coll., JAVYS, a.s. is a legal entity established and commissioned by the Ministry of Economy of the Slovak Republic ensuring storage of SNF in accordance with Section 10, par. 3 of Act No. 541/2004 Coll., stating that: "For the purpose of assurance of nuclear safety and to avoid unreasonable accumulation of radioactive waste and spent fuel, during the commissioning and the operation of nuclear installation, the licence holder is obliged to submit its radioactive waste at the latest 12 months after their production and as regards the spent fuel without any delay after fulfilment of the requirements for its safe shipment and storage, to the legal entity as settled in Section 3 par. 9 for their further management."
Under Act No. 24/2006 Coll. on environmental impact assessment and on changes and amendments to certain laws, as amended by later legislation, the change in the proposed activity has been classified under Annex No. 8, category 2 Energy Sector, items 9 "Spent nuclear fuel or radioactive waste storage facilities (scheduled for more than 10 years) at a location other than the place of production".

Present situation:
The nuclear facility "Interim spent fuel storage facility" was built in the period 1983-1987 based on the building permit reg. No. Výst.164/83 dated 1.3.1983 and was placed into service by final approval reg. No. Výst. 235/88-Va dated 22.2.1988 as a so-called "wet storage" of spent nuclear fuel. It involves storage of spent fuel assemblies in containers placed in water pools under relatively low utilisation rate of the volume of the pools, and the water, as the storage medium ensures decay heat removal and also serves as shielding from radioactive radiation.
Wet storage is a long-proven SNF storage method in most countries with nuclear programs. One of the key advantages of wet storage systems is the fact that the stored fuel is easily accessible and controllable. Storage pools enable storage of a relatively large amount of fuel at a time. Water environment enables better heat removal considering the higher thermal conductivity of water compared to air.
In the period from 1997 to 2000, the project of "seismic retrofitting and expansion of ISFSF capacity" was executed. These activities were assessed under Act No. 127/1994 Coll. and the final opinion of the Ministry of Environment of the Slovak Republic was issued on 19.2.1997. A building permit for renovation has been issued by the Regional Authority, Environmental Division, under reg. No. KÚ-OŽP-2/03349/97/Ec-A dated 29.10.1997. After the renovation was completed, the approval to operate the renovated Interim SNF Storage Facility was issued in form of a decision of the Nuclear Regulatory Authority of the Slovak Republic No. 152/2000 of 30.11.2000, which was valid until 31.12.2010. Further permit for continuation of the operation was issued by decision No. 444/2010 of 9.12.2010 based on periodical evaluation of nuclear safety, which remains valid by 31.12.2020.
ISFSF is a standalone building in JAVYS, a.s. site in Bohunice location. The entrance to the building and the exit from the building goes through a sanitary loop; the premises of the ISFSF have the characteristics of a controlled zone. Depending on the level of radiation, the premises are classified as attended premises, periodically attended premises and unattended premises.

Considering the technological terms, the building of the Interim SNF Storage Facility is divided into two sections: the container section and the storage section.
The container section consists of a container hall that serves for handling, decontamination and inspection of containers and a siding corridor for unloading and loading of containers on transport wagons. The fuel is transported from the storage pool in the reactor hall to ISFSF in a reservoir placed in TK C-30 container. The container is transported by a special carriage.
The storage section is comprised by 4 storage pools sized 23.4 x 8.4 x 7.2m. One of the pools serves as a reserve pool in case of necessity to remove fuel from permanently filled pools. The storage pools are interconnected by a transportation handling channel. The bottom of the pool is on the ±0,000m level, covering of the pool is at +7.200m level. The level of the cooling water is permanently kept at +6.300m. Reservoirs are transported at maximum elevation 600mm above the bottom of the transportation pool and the storage pools.
The technical solution of SNF storage involves spent fuel assemblies stored under water level in storage pools in a vertical position in KZ-48 storage reservoir. KZ-48 storage reservoir is designed to ensure subcriticality of the stored fuel and integrity of fuel assemblies in case of an earthquake. Spent fuel is shielded by water surrounding the fuel assemblies and concrete pool walls. The water ensures removal of decay heat from the spent fuel and together with the concrete walls, it provides a proper biological protection from radioactive radiation. KZ-48 reservoirs are used for storage of intact fuel assemblies and T-13 reservoirs are used for untight fuel assemblies placed in hermetic boxes. Each storage pool enables to store 98 compact reservoirs of KZ-48 type (in 14 rows per 7 reservoirs), each reservoir can hold 48 assemblies.
The walls are equipped with double tiling. The internal tiling being in direct contact with the medium is made from a stainless steel, the external tiling is made from carbon steel. During the whole period of the operation of the ISFSF, the pools and other equipment with pool water have been tight with no leakage observed.
After the renovation and the seismic retrofitting the maximum projected storage capacity of the ISFSF is 14 112 fuel assemblies, which is sufficient for storage of all spent nuclear fuel generated during operation of units 1 and 2 of V1 NPP and 3 and 4 of V2 NPP. Presently it is filled to approximately 80% of the free storage capacity, which is sufficient until 2022.
The ISFSF has its own cooling and purification station. Operation of the cooling station is periodical as needed for cooling of pool waters and maintenance of temperature of the water in required values. The purification station serves for maintenance of the required quality of pool waters in the required parameters, which is ensured by mechanical filtration and ion exchange. The radiation control system ensures monitoring of the radiation situation inside and in the surroundings of the ISFSF and monitoring of individual radiation doses of the staff.
The HVAC systems ensure ventilation and air conditioning of premises of the ISFSF to meet the operation requirements in terms of radiation safety, including in terms of proper working conditions for the staff of the ventilation chimney of ISFSF equals 35 m. The air exhausted by ventilation system is filtered from Ra - aerosols using four available filtration stations which are employed, as needed, in paths for various air flows.
The purpose of the exhausting ventilation systems when handling spent nuclear fuel is to prevent leakage of activities otherwise than through aerosol filters. There is an ongoing monitoring of the outlet activity in the ventilation chimney.

Present operation of the nuclear facility – ISFSF in Jaslovské Bohunice has been permitted by decision of the Nuclear Regulatory Authority of the Slovak Republic No. 444/2010, including permits for:

1. Operation of the ISFSF,
2. Permit for treatment of nuclear materials at ISFSF,
3. Permit for treatment of spent nuclear fuel at ISFSF in the extent as defined by the “Plan for spent nuclear fuel treatment at ISFSF including transportation“,
4. Permit for treatment of radioactive waste at ISFSF in the extent as defined by the “Plan for

radioactive waste treatment at ISFSF including transportation".

Proposed situation

The expansion of SNF storage facilities to receive the expected amount of spent fuel, which is, based on the assumed generation of SNF from operated nuclear power plants in Slovakia defined as further 18 600 fuel assemblies (FA), is feasible at the site of JAVYS, a.s. in Jaslovské Bohunice in two phases.

Considering the existing operation of the Interim SNF Storage facility it is assumed that storage premises will be built including a transport corridor to interconnect it to the present building to the Interim SNF Storage Facility. Besides the zero scenario (the present situation) proposed were 3 optional technology solutions for SNF storage:

1. Expanding the SNF storage facility by wet storage – completion of the storage capacity of the SNF storage pools and extending the present building of the Interim SNF Storage Facility using the present KZ-48 storage reservoirs for 48 SNF assemblies.
2. Expanding the SNF storage facility by dry storage - with building interconnection to the present building of the Interim SNF Storage Facility using transporting and storage containers for maximum 84 SNF assemblies placed on a hard surface in the storage hall of the SNF storage.
3. Expanding the SNF storage facility by dry storage - with building interconnection to the present building of the Interim SNF Storage Facility using storage containers (canisters) for maximum 85 SNF assemblies placed in ferro-concrete storage modules of the SNF storage.

The advantage of the local solution in Jaslovské Bohunice is mainly use of the possibility to move the inventory from the wet interim storage to a dry interim storage using proper package set for the selected storage technology followed by wet storage of SNF generated by operation of units, after it is partially cooled in the spent fuel storage pool. Storage of SNF in storage pools of the present Interim SNF Storage Facility ensured active cooling necessary for high burn-up and initial enrichment nuclear fuel. After sufficient time of cooling it is possible to store it effectively on a long-term run using a dry passive storage and several technological types of package sets. Considering the inventory of the existing Interim SNF Storage Facility, the first phase of the dry interim storage (10 100 FAs) involves relocation of fuel with production enrichment of 1.6%, 2.4%, 3.6% and 3.82% ^{235}U. Presently, such fuel is in many countries dry stored using several technologies and meeting all technical requirements for a safety and reliable storage using passive cooling systems. Relocation of fuel assemblies can be done using the existing transport, technology and storage systems of the Interim SNF Storage Facility. Generally, before final deposition, e.g. in a deep repository, or reprocessing, the fuel would be gathered in one location.

Considering availability of the existing systems and exclusion of transportation for relocation of the oldest fuel from wet interim storage facility, it is reasonable to make the building interconnection with the existing ISFSF.

The key advantage of dry storage is its easy implementation. Dry storage is easy to transport; it requires only a few or none active systems. Capacity of the storage can be easily adjusted as necessary (modular storage systems). Additionally, SNF stored this way is relatively easily transportable if needed.

SNF dry storage is applied mainly where SNF is not intended for reprocessing.

Besides favourable business aspects, compared to wet storage, dry storage is recommended mainly for the following reasons:

- it does not require active systems (and/or minimum amount – e.g. pressure monitoring systems, batch input systems and temperature measuring systems),

- lower maintenance requirements,
- easy operation and customization to changed client's requirements,
- less secondary waste,
- low inherent risk of accidents resulting from the nature of the storage.

On the other hand, disadvantages of wet storage include necessity of active cooling systems and water purification, other support systems and permanent activity of the operator. Purification of cooling media produces liquid waste, which (depending on the level of activity) need to be further adjusted and processed. That, *inter alia*, means necessity of sufficient capacities and technologies for treatment of the radioactive waste, which J. Bohunice location enables.

Description of scenarios:

Zero scenario

Presently, after removed from the reactor, spent nuclear fuel (SNF) at V2 Jaslovské Bohunice NPP and Mochovce NPP (units 1 & 2) is shortly stored in the spent fuel storage pool (until it meets requirements for safe transportation and storage). The necessity to store SNF in a storage pool stems from generation of decay heat after the fuel is removed from the reactor. After the lapse of the storage time, the fuel kept in V2 Jaslovské Bohunice NPP and Mochovce NPP (units 1 & 2) is transported to wet interim SNF storage facility (ISFSF) located in the site of JAVYS, a.s. in Jaslovské Bohunice. SNF is transported by rail in TK C-30 transport container, using T 12, T 13 and KZ 48 reservoirs. The preferred reservoir is the compact reservoir KZ 48. The conditions and technical limitations defining SNF transport options from the storage pool to the Interim SNF Storage Facility Jaslovské Bohunice using the approved type of TK C-30 have been defined based on safety analyses assessing subcriticality of the transported fuel.

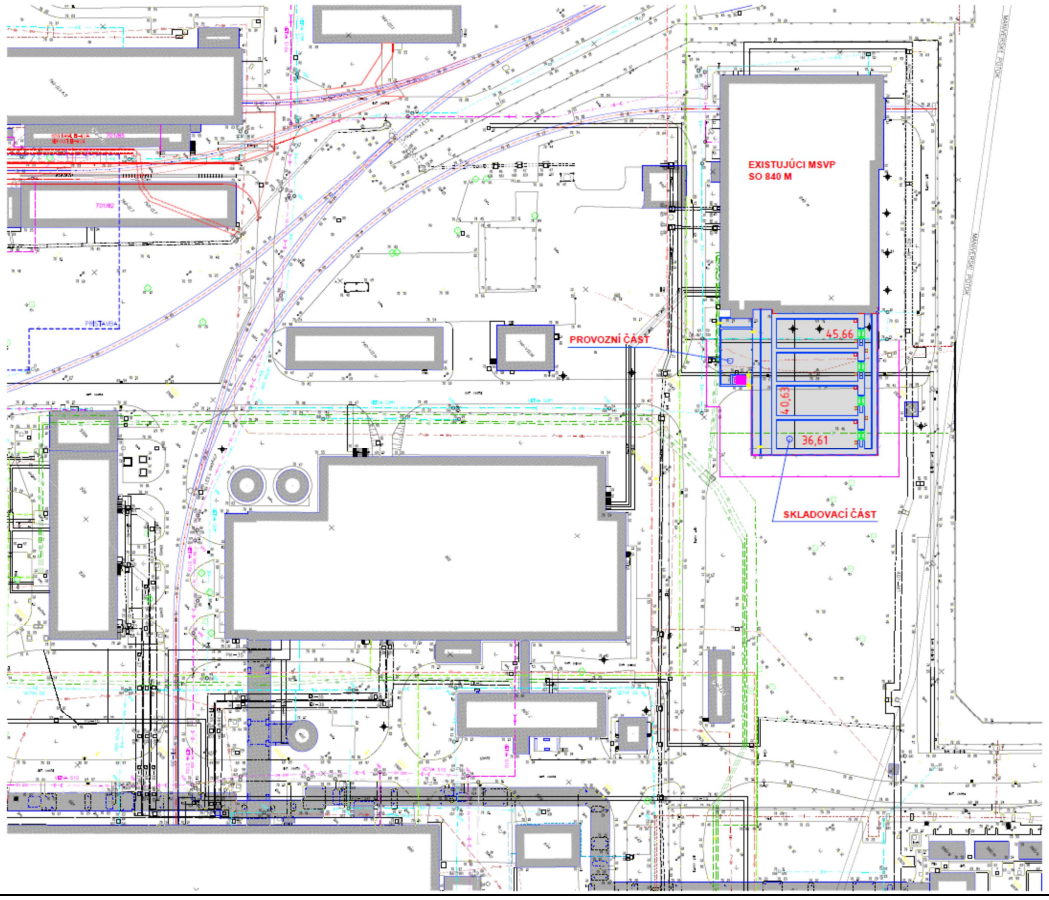
The zero option means keeping the *status quo*, i.e., the storage capacity of the present Interim SNF Storage Facility shall not be expanded. Such situation may lead to two scenarios in future development of SNF treatment:

1. Spent fuel will be stored in storage pools next to the reactor (3-7 years SE-EMO, 3-4 years for V2 J. Bohunice NPP). At SE-EMO, SNF is stored in a compact storage grid. The capacity of the compact storage grid for one pool is 603 spent fuel assemblies. SNF assemblies with damaged cladding are stored in hermetically sealed casings. Each storage pool holds 54 hermetic casings. The capacity of the storage grid at SE-EBO is 384 spent fuel assemblies, and 60 hermetic casings. The base of the storage grid consists of hexagonal absorption tubes to which spent fuel assemblies or hermetic cases are inserted. As soon as the grid is full, relevant power plant unit must be shut down as the pools do not provide further place for further spent fuel. However, the systems supporting operation of the spent fuel storage pools (cooling systems, pool water purifying, air conditioning and ventilation systems, radiation control and dosimetry, electricity supply, etc.). Such condition, however, is not sustainable and the issue of spent fuel treatment will have to be resolved by the moment of decommissioning of the power plant, at the latest, or until it is decided on further treatment of the SNF and until the decision is implemented. Presently, all involved systems have been adjusted solely to use of the existing C-30 transport package for SNF wet transportation.
2. The spent fuel is relocated. Such option (transport to a reprocessing plant or to other national and/or regional international long-term storage facility), however, is not assumed, either presently or in a foreseeable future, whether absolutely or to a limited extent. The capacity of the existing ISFSF in Jaslovské Bohunice suffices until 2022.

The storage and operation of the present Interim SNF Storage Facility is described in part “Present Situation”.

Option No. 1: Expanding the SNF storage facility by wet storage – completion of the storage capacity of the SNF storage pools and extending the present building of the Interim SNF Storage Facility using the present KZ-48 storage reservoirs for 48 SNF units

To increase the storage capacity by total 18 600 FA as required, 4 storage pools need to be built including the related technology and extension of the transport pool. When considering the building interconnection with the existing Interim SNF Storage Facility in Jaslovské Bohunice, the plan under consideration is to use the existing storage reception hall including the existing technology and sanitary installations necessary for operation of the storage (sanitary loop with change rooms and sanitary facilities, offices and control room for radiation control). Considering the applied wet storage technology and the necessity to avoid leakage, the construction works would have to be done in one phase. The incoming fuel would be stored similarly to the presently used system – in KZ-48 compact reservoirs. This solution is a follow-up to the initial project involving expansion of the storage capacity of the South-East part of the storage.
The benefit of this solution is mainly the small storage area, easy access and control over condition of the FA. Disadvantages include mainly substantial technical demands on expansion of the construction of pools (with maintaining their tightness, robustness and even subsidence of the building), including extension of the technology systems and transport technology.

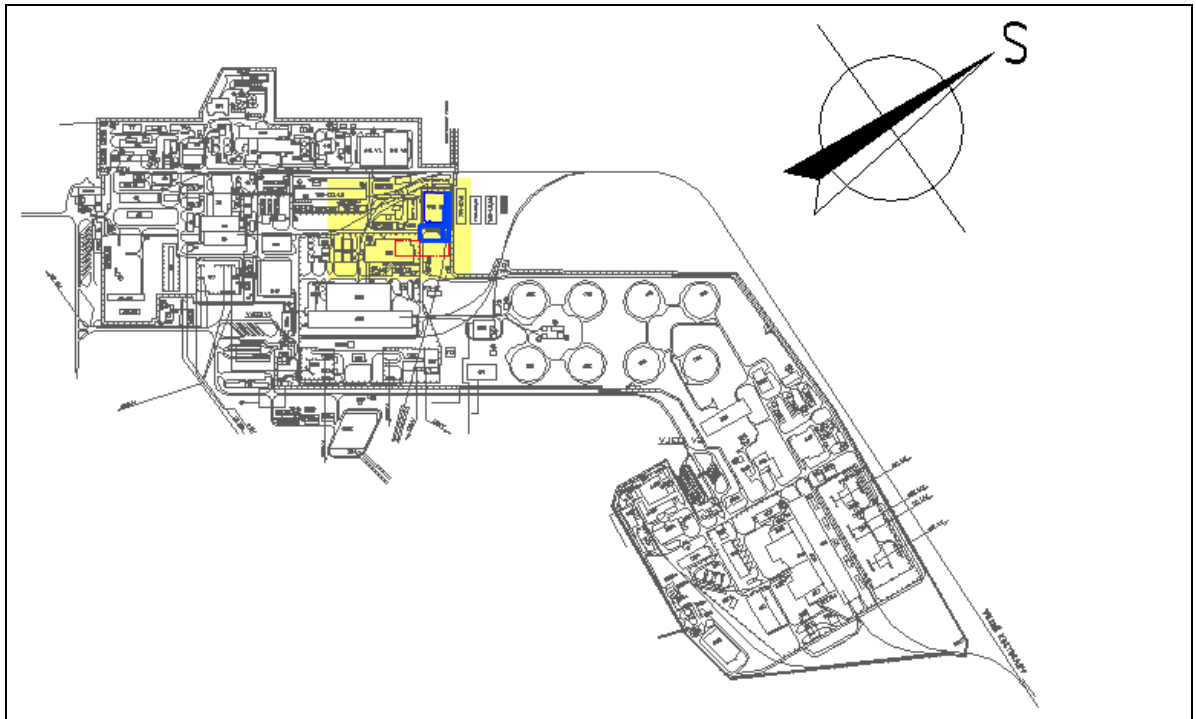


Option No. 2: Expanding the SNF storage facility by dry storage - with building interconnection to the present building of the Interim SNF Storage Facility using transporting and storage containers for maximum 84 SNF units placed on a hard surface in the storage hall of the SNF storage facility

The technical solution of completion of the SNF storage facility involves building interconnection with the existing Interim SNF Storage Facility. Modification of the existing transport corridor and adding a new transport corridor will result in further technical area, i.e. the reception area plus dry storage premises. The storage part of the wet storage facility will not be affected by the construction.
In case of implementation of this option, the company would use transport and storage containers, which could be made either from metal or concrete. Another considered option is storage in the building which is primarily designed for protection of containers from climatic effects. The design of the building enables passive removal of heat from the surface of storage containers.
Vertical metal and/or concrete containers will be placed on the basement slab in the storage hall on or below the ground level. The containers will be relocated directly to the storage part of the interim storage facility.
The heat generated by the stored SNF is removed from the containers by natural ventilation and the cooling air is drawn in through openings around walls in their lower part and the air outlet is led through the roof.
The double-purpose package set (typically a container) has been designed and approved for storage and transportation of SNF for the given fuel type and parameters.
The outer package serves as a protection from external effects and, at the same time, as a biological protection from ionizing radiation. It is mostly made as a casting or a forged piece from low-alloy carbon steel, or as so-called "sandwich" structure which is a combination of steel and concrete or composite. The inner basket (grid) is designed for storage of fuel assemblies and it enables sufficient removal of heat and subcriticality using a proper neutron absorber. Typically it is made from boron-alloyed premium steel or aluminium and boron based composites using nanotechnologies.

Option No. 3: Expanding the SNF storage facility by dry storage - with building interconnection to the present building of the Interim SNF Storage Facility using storage containers (canisters) for maximum 85 SNF units placed in ferro-concrete storage modules of the SNF storage

The storage system in building structures ("the vault system") is intended as an underground ferro-concrete cell-type structure. The heat is removed by natural air circulation through input and output inner cell walls and the air duct. Shielding is provided by the design of the storage cell. Each of the storage cells contains several metal canisters with SNF stored inside. Although the modular structure enables gradual expansion of the storage capacity, owing to restrictions on the unbuilt area, the Company considers extension of the storage capacity by making a rank by two, which would make it possible to use the modular structure in the third phase.
Vertical metal canisters are placed in concrete modules on bases adapted for circulation of cooling air and preventing accumulation of condensed water. The upper part of the canisters is equipped with a robust plug embedded to the upper arched structure which is designed to resist the load applied during embedding the canister in the cell or in case that a heavy thing falls inside the storage premises.



3. Reference to other planned and implemented activities in the affected territory and potential disaster risks considering used substances and technologies.

The proposed activity – completion of SNF storage facilities will not affect operation and/or decommissioning of other nuclear facilities of JAVYS, a.s. in Jaslovské Bohunice location. The Company (presently SE, a.s.), operating the nuclear power plants will be provided with sufficient capacity for long-term safe storage of SNF, including potential transportation between Mochovce and J. Bohunice locations and between nuclear facilities in J. Bohunice location. No new risks have been identified under option No. 1 in relation to operation of the Interim SNF Storage Facility. Under options No. 2 and 3 spent fuel elements are safely stored in storage equipment characterised by high basic safety even under extreme conditions. The basic safety criterion in all spent nuclear fuel dry storage methods is always achieving passive subcriticality of the system (design and construction materials of the canister internals, configuration of the inventory). The modules have been designed and arranged in a way ensuring a stabile position of the fuel assemblies and, consequently, subcriticality during depositing, storage, withdrawing and in case of a disaster (upon handling or transportation, if any, fall, fire, earthquake, etc.). Considering the location and the interconnection with the existing building of the Interim SNF Storage Facility completion of the storage facility does not require new connections to utility lines in J. Bohunice site.

4. Type of the required permit for the proposed activity under special regulations.

The Petitioner will apply to the Nuclear Regulatory Authority of the Slovak Republic (ÚJD SR) (the Building Authority) for the building permit in accordance with Act No. 50/1976 Coll. and in accordance with Act No. 541/2004 Coll. for approval of the change in the nuclear facility.

5. *Opinion on estimated impacts of the change in the proposed activity exceeding the state borders.*

The changes in the proposed activity are **not expected to have any effects** exceeding the state borders. The present operation of Interim SNF Storage Facility does not have any impact on the neighbouring countries or on completion of the storage facilities for either wet or dry storage and is not expected to have any effect exceeding the state borders.

6. Key information of the present state of the environment of the affected territory, including human health

II.1. GEOMORPHOLOGICAL BAKGROUND

The affected location including most of the affected territory is classified (Mazúr, Lukniš in Atlas krajiny SR, 2002) as a part of the Alps-Himalaya System, Pannonian Basin subsystem, West-Pannonian Basin province, Small Danube Basin sub-province, the Danubian Lowland area, celku Danube Uplands unit, Trnava Uplands subunit and Trnava Plain. The North-Western edge of the affected territory reaches to another part of Trnava Uplands – Sub-Little Carpathian Uplands and the Lower Váh Alluvial Plain sub-unit, part Dudváh Wetland (South-East).

II.2. GEOLOGICAL CONDITION

GEOLOGICAL STRUCTURE

In geological terms, the investigated area is located in the Northern edge of the Danube Basin, in Blatnianska Depression. Blatnianska Depression is classified as a tertiary sedimentary basin, because the sediments prevailing in its filling are tertiary (cenozoic) sediments of sea origin. The quaternary upper layer is comprised mainly of rendzina soils, loess and loess soils (Trnava Loess Plain) and in the vicinity of Váh river also alluvial soils and terraces.

ENGINEERING-GEOLOGY CONDITIONS

Engineering-geology conditions are characterised as simple:

0.0 – 1.5 m	Anthropogenic sediments
(1.5 – 2.4 m)	Remains of original rendzina soils (fully missing at certain places)
1.5 – around 15.0 m	Loess soils (quater– Pleistocene)
15.0 – 17.0 m	Dusty clays (quater– Pleistocene? – maybe pliocene)
below 17.0 m	Sandy-gravel sediments – Trnava formation (Tertiary Period –late pliocene – ruman)

HYDROGEOLOGICAL CONDITIONS

The affected positions of quaternary rocks (anthropogenic sediments, rendzina soils, loess soils) do not have developed a continual level of underground water. The body of the underground water is developed in the base Pliocene sandy-gravel sediments. The level of the underground water is in the altitude around 151 m above sea level (in the investigated territory around 19 – 20 m below the surface level).

HILL SLOPE MOVEMENT AND EROSION PROCESSES - exogenous geodynamic events

Plain to mildly undulated topography of the surroundings of Jaslovské Bohunice nuclear facility does not indicate a potential for occurrence of any significant exogenous geodynamic events.

SEISMICITY OF THE TERRITORY – endogenous geodynamic events

The underlying studies assume that the strongest earthquake which could occur in Jaslovské Bohunice could reach 6 – 6.5º MCS, which equals 4.2 of the Richter scale.

MINERAL DEPOSITS

The most significant mineral deposits in the affected territory and its immediate surroundings are deposits of combustible natural gas tied to Baden-age sediments of sea origin of Trnava bay at the Danube Basin (approximately 2 kms northward from the site of Jaslovské Bohunice nuclear facility).

POLLUTION OF THE ROCKY ENVIRONMENT

When assessing pollution of the rocky environment it is necessary to consider possible transfer of pollution from other components of environment (see other chapters).

II.3. SOIL CONDITIONS

Almost the whole site of Jaslovské Bohunice nuclear facility is has originally been located on brown-soil black earth, at the place of construction changed into antrosoil. When using a larger scale coefficient on the affected territory regosoil can be identified in the vicinity of water flows and erosion

rills.
In accordance with NC SR Act No. 220/2004 Coll. on the protection and use of agricultural land in the vicinity of the nuclear facility were found mainly soils of 2nd, 3rd, 4th and 6th agricultural land quality classes.

QUALITY OF SOIL AND SOIL POLLUTION LEVEL

Following the publication "Atlas krajiny" (Ján Čurlík, Peter Šefčík, 2002) soils of the affected territory are categorised as not contaminated or relatively clean soil.

As to occurrence of ***radioactive substances*** in soils, the soil in the affected territory is monitored for weight activity. Samples are taken once a year; sampling is divided into two groups, samples from grass areas are taken in spring and samples from plough land are taken in autumn. The landscape INSITU gamma spectroscopy is also performed twice a year, in spring and in autumn.

Based on the measured values it can be concluded that none of the samples taken for identification of weight activity of soil exceeded the defined investigation levels.

II.4. CLIMATIC CONDITIONS

Climatic conditions of the assessed territory is lowland, mostly warm, the territory belongs to A3 climatic zone (warm, mildly dry, with mild winters).

During the last 35 years, average meteorological conditions in Jaslovské Bohunice were as follows:

- Average air temperature (ºC): 9.4
- Maximum air temperature (ºC): 36.6
- Minimum air temperature (ºC): -26.1
- Average temperature of the coolest month (January) (ºC): -1.5
- Average temperature of the warmest month (July) (ºC): 19.5
- Average air humidity (%): 75.0
- Average annual rainfall (mm): 533.0
- Prevailing wind direction: NW
- Average wind speed (m/s): 3.9
- Average number of days with snow cover: 40.0
- Average snow height (cm) in winter (November - March): 5.3
- Maximum snow height (cm) for the last 35 years: 47.0

Assessment of risks involves also important data on extreme rainfall, which was determined as 65 l/s/ha (5.85 mm per 15 minutes).

II.5. AIR POLLUTION

As to ***usual polluting substances*** it can be concluded that in the specified affected territory there is no area of controlled air quality and there are more than twenty large and mid-sized sources of pollution registered with NEIS system ((National Emission Information System of Slovak Republic).

At the affected territory, emission situation for usual polluting substances is not monitored. Following the existing environmental regionalization in Slovakia, the location and its vicinity have been classified as areas with mild air pollution.

Considering the air pollution burden of the affected territory by ***gas emissions of radionuclides,*** the activity of aerosols and activity of fallout in the territory and its vicinity is monitored.

II.6. HYDROLOGICAL CONDITIONS

SURFACE WATER FLOWS

In hydrographic terms, the axis of the assessed territory is Váh river, passing approximately 8 km Eastward from the site of Jaslovské Bohunice nuclear facility. The affected territory is a part of the drainage basin of lowland river Dudváh, which discharges itself to river Váh approximately 16 km SSE from Siladice village.

The area of the site of the nuclear facility reaches to two catchment areas, namely the catchment area (drainage channel) Manivier and the catchment area of Pečeňady channel. Both the aforementioned flows are flows of 4th degree and have a nature of a lowland flow.

Considering the distance of the rivers, the landscape and the elevation of the locations it can be concluded that the nuclear facility cannot be directly endangered by flood from the surrounding water

flows and waterworks.

POLLUTION OF SURFACE WATERS

Pollution of surface flows in the vicinity of Jaslovské Bohunice nuclear facility, is monitored under "Partial Monitoring System – Water" only within Trakovice landscape at Horný Dudváh river. However, considering the location, monitoring is focused mainly on activity of surface waters. The values measured in the profile meet the requirements of Annex No. 1 of the Slovak Government Regulation No. 269/2010 Coll. which stipulates criteria for achieving good quality of water.

As to occurrence of ***radioactive substances*** in surface waters, in the affected territory and its surroundings, the monitoring system that has been built owing to the operation of the nuclear facility monitors the volume activity of surface waters and weight activity of sediments.

UNDERGROUND WATER

In terms of hydrogeological zoning, the assessed territory ranks among Q 050 underground water region "Quaternary Trnava Uplands".

In the surroundings of Jaslovské Bohunice nuclear facility, this region is represented by a hydrogeological set of Quaternary eolithic sediments with the role of regional insulators (eQp) – loesses and loess soils of Pleistocene – Holocene ages.

POLLUTION OF UNDERGROUND WATER

Considering pollution of underground waters by ***common polluting substances*** it can be concluded that the monitoring closest to the target location is done within "Partial Monitoring System – Water" in Šulekovo location (Quaternary formation) and Radošovce location (Pre- Quaternary formation). The extraction points met the monitored indicators as required by Slovak Government Regulation No. 496/2010 Coll., changing and amending the Slovak Government Regulation No. 354/2006 Coll., pursuing requirements for water intended for human consumption, and water quality control for water intended for human consumption, with the exception of concentration $Fe_{celk.}$ ($\geq$0,2 mg/l) in Radošovce.

As to occurrence of ***radioactive substances*** in underground waters in the affected territory and its surroundings is monitored by volume activity of drinking water and volume activity of underground waters.

II.7. FAUNA AND FLORA

Phytogeography characteristics and restored vegetation

In terms of phytogeographic classification, the affected territory is in Trnava Uplands district, in an uplands area, lowland subzone of an oak-tree zone. Majority of the affected territory belongs to sub-district of Trnava Plain, the North-West edge of the territory reaches to the sub-district Sub-Little Carpathian Uplands (*Atlas krajiny SR*, 2002).

Potential natural vegetation of Trnava Loess Plain is a prairie with xerophilous vegetation or peri-Pannonian oak and hornbeam forests. At slopes of the hills it would be oak-tree and oak-quercus cerris forests. So-called "hard floodplain forests"– i.e. ash-elm and oak-tree forests, would grow in the flood plains of lowland flows.

The presently assessed territory is a part of the cultural land with prevailing agricultural production. The original vegetation of the affected territory has been mostly transformed to areas subject to intense agricultural activities surrounding also the vicinity of the nuclear facilities.

Fauna

Based on the zoogeographical regionalization, the affected location and its surroundings belong to prairie province (*Atlas krajiny SR*, 2002).

DETERIORATION AND CONTAMINATION OF BIOTOPES

Owing to specific use of the affected territory for operation of nuclear facilities, as a part of environmental monitoring activities for identification of contamination by radionuclides, besides air, soil and water samples, monitored are also certain parts of food chain (fedstuff, milk, etc.), which to a certain extent indicate contamination of natural biotopes in the affected territory. Based on all measured values, it can be concluded that neither agricultural commodities nor any other monitored parts of the living nature in this territory exceeded the defined investigation levels in weight activities.

II.9. AREA PROTECTED UNDER SPECIAL REGULATIONS AND THEIR ZONES OF PROTECTION

The affected location and its surroundings are in the territory falling under first degree of nature and land protection in accordance with NC SR Act No. 543/2002 Coll. on nature and landscape protection, as amended.
The nearest ***large-scale protected area*** to Jaslovské Bohunice nuclear facility is the Little Carpathians Protected Landscape Area (CHKO Malé Karpaty). The area spreads to the West of the affected municipalities, in the air distance of approximately 10 km.
From among ***small protected area*** the nearest to the nuclear facility are:

- Protected site Dedova jama (around 6 km Eastward from the nuclear facility)
- Protected site Malé Vážky (around 7 km South-Eastward from the nuclear facility)
- Protected site Trnava Fishponds (around 17 km South-Westward from the nuclear facility)

The nearest protected bird territory *is the protected Bird Area SKCHVU054 Špačinsko-nižnianske polia, which extends directly to e.g. cadastral area. Jaslovce, Bohunice, Radošovce or Malženice, and its border reaching nearest to the site of Jaslovské Bohunice nuclear facility is approximately 1 km from the North*
From among ***territories of European importance*** situated in broader surroundings of the affected territory, worth mentioning are: SKUEV0267 Biele hory (approximately 21 km Westward from the site of the nuclear facility), SKUEV0174 Lindava (approximately 27 km South-Westward from the site of the nuclear facility), SKUEV0277 Nad vinicami (approximately 18 km Westward from the site of the nuclear facility), SKUEV0175 Sedliská (approximately 12 km South-Eastward from the site of the nuclear facility), SKUEV0074 Dubník (approximately 20 km Southward from the site of the nuclear facility).
None of the trees in the affected territory has been declared as a ***protected tree***.
The affected territory does not contain any ***wetland*** of national or regional importance, however, cadastres of the affected municipalities include two wetlands of local importance.
There is no ***water-management protected area*** directly reaching out to the affected territory.

II.10. TERRITORIAL SYSTEM OF ECOLOGICAL STABILITY

The following elements of the territorial system of ecological stability at regional and superregional level have been defined in the surroundings of the target location: Váh river (superregional Bk), Dudváh river (regional Bk), Blava river (regional Bk), Dedova jama (regional Bc). Anyway, none of the items under the Territorial System of Ecological Stability is in direct contact with the affected location.

II.11. POPULATION

POPULATION IN THE AFFECTED TERRITORY

Number of inhabitants in the affected municipalities as at 31.12.2011

District	*Municipality*	*Number of inhabitants*			*Density of population per km²*
		Total	*Men*	*Women*	
Trnava	Jaslovské Bohunice	2015	1019	996	100
	Radošovce	426	205	221	59
	Malženice	1379	670	709	93
	Dolné Dubové	649	322	327	65
Piešťany	Veľké Kostoľany	2708	1369	1339	111
	Pečeňady	511	254	257	60
	Nižná	529	258	271	66
Hlohovec	Ratkovce	329	175	154	74
	Žlkovce	638	325	313	80

Total	***9 184***	***4 597***	***4 587***	***-***

(Source: Statistical Office of the Slovak Republic, 2013)

AGEING STRUCTURE OF THE POPULATION IN THE AFFECTED TERRITORY

Ageing structure of the population in the affected municipalities as at 31.12.2011

MUNICIPALITY	**Pre-productive age**		**Productive age**				**Post-productive age**	
	Number of inhabitants	**%**	**Number of inhabitants – women**	**%**	**Number of inhabitants – men**	**%**	**Number of inhabitants**	**%**
Jaslovské Bohunice	338	16.8	596	29.6	692	34.3	389	19.3
Radošovce	58	13.6	131	30.8	144	33.8	93	21.8
Malženice	263	19.1	429	31.1	444	32.2	243	17.6
Dolné Dubové	91	14.0	193	29.8	224	34.5	141	21.7
Veľké Kostoľany	461	17.0	781	28.9	908	33.5	558	20.6
Pečeňady	70	13.7	147	28.8	181	35.4	113	22.1
Nižná	76	14.4	140	26.5	171	32.3	142	26.8
Ratkovce	54	16.4	94	28.6	116	35.3	65	19.7
Žlkovce	100	15.7	181	28.4	218	34.2	139	21.7

(Source: Statistical Office of the Slovak Republic, 2013)

HEALTH CONDITION OF THE POPULATION

The health condition of the population results from assessment of several factors, such as the economic and social situation, eating habits, lifestyle, quality of healthcare and the quality of the environment. Effects of polluted environment on human health is reflected mainly in such indicators as lifespan at birth, total mortality rate, infant and neonatal mortality rates, number of risk pregnancy cases and numbers of children with inborn and developmental defects, causes of death statistics, numbers of allergy, cardiovascular and cancer diseases, sanitary conditions, spread of addiction to narcotics, alcohol and smoking, statistics of sickness and disability, occupational diseases and professional intoxication.

Details of natural movement and average number of population in Piešťany, Trnava and Hlohovec districts are provided in the table below:

Territorial district	Average population	Live-born	Dead	Natural increase (decrease) in population
Piešťany	63 110	607	680	38
Trnava	128 556	1 365	1 120	521
Hlohovec	45 772	451	423	-10

(Source: *Zdravotnícka ročenka SR* 2011, ÚZIŠ Bratislava, 2012, www.nczisk.sk, 2013)

When comparing the statistic data for a longer period, during the last few years the Slovak Republic did not experience any significant changes in the structure of mortality by causes of death: cardiovascular diseases, cancer, respiratory diseases, digestive system diseases and external reasons for bad health and mortality.

The population of municipalities surrounding the complex of nuclear facilities at Bohunice location live under conditions where the quality of their lives is affected by a number of factors. This includes mainly impact of transportation and the intense agricultural activities, industrial activities and operation of the nuclear facilities.

The statistical evaluation of demographic indicators and indicators of health condition of the population in vicinity of Jaslovské Bohunice nuclear facilities have not clearly proven ant significant deviations which would indicate a negative impact of the operation of the nuclear facilities on health condition of the population.

Further details on condition of the environment in the vicinity of the nuclear facilities in Jaslovské Bohunice have been described in Environmental Impact Assessment Reports prepared for the proposed

activity "Radioactive Waste Processing and Treatment Technology of JAVYS, a.s. in Jaslovské Bohunice location", "2nd Phase of Decommissioning of V1 Nuclear Power Plant", which have been published and the activities were discussed in public.
Effects of nuclear facilities operated in Jaslovské Bohunice location is subject to monitoring in accordance with the approved monitoring program and the results of the monitoring are summarised in reports named "*Radiation protection in JAVYS, a.s. and the impact of JAVYS, a.s. site on the surroundings"* issued for every calendar year. Effects not resulting from ionizing radiation are assessed in the document "*Environmental Report"* (water management, air protection, waste management and other components of the environment) for each passed calendar year.

IV. Impact on the environment and human health including cumulative and synergic.

Impact of the construction works
Generally, the phase of construction is only temporary and will not have any significant impact on the surrounding environment when managing the relevant outputs.
Building activities include road traffic – movement of heavy trucks, building machines and use of various building materials. These activities make noise, vibrations and pollute the air and the surrounding environment by building dust i.e., dust particles sized 2.5 -10 µm.
Impact on the air:

- Emissions of exhaust gas from the building machines,
- Dust from ground building works.

The aforementioned effects on the air will be temporary, short-term and reversible.
Impact on water: Construction of the dry storage will require availability of drinking water, water for cleaning and work done on the spot, such as concrete, wet processes. During the construction, the consumption of water compared to the present status, will increase. The building works will generate a limited amount of sewage water (waste water), which will be led to the waste water drainage system with purification in a mechanical and biological sewage water treatment plant.
The noise and the dust during the construction are limited to the construction area and have no impact in the environment. The only possible effects are those of noise made by vehicles transporting inert materials; the effects can occur in the zone within 30 km as the roads to the site lead through the surrounding villages.

Effects of the operation
As the Interim SNF Storage is a non-manufacturing site, the environmental impact of the operation, such as noise, dust, radiation and sewage water and waste generation, will be negligible.
In terms of occurrence of radioactivity, the site of SNF storage is split into two zones:

- Free zone (clean)
- Controlled zone (not clean).

There are no special requirements on air conditioning.
Owing to the activity in the controlled zone, the air conditioning systems have to meet the following requirements:

- Ensuring rectified circulation so that the air flows in the direction of the increasing activity
- If necessary, the direction of the movement in the room is regulated by negative pressure in the technology equipment
- Rooms with occurrence of radioactivity shall be in negative pressure compared to the external atmosphere

HVAC systems provides proper sanitary conditions for the staff and for the technology equipment ensures ventilation and removal of decay heat from the stored containers with spent fuel. Air conditioning enables meeting the required temperature range, considering more or less the existing technology equipment.

It is assumed that the storage part of the **dry** interim storage facility (options No. 2 and 3) will use natural ventilation. The incoming air will flow through a shutter, which will be embedded in the lower part of the external cladding.
The air will be discharged through a shutter on the opposite side in the upper part of the external cladding or in the roof construction of the internal SNF storage facility.
Other premises will be equipped with a power flow-through ventilation. The incoming air will be filters and warmed to reach the required temperature. The offtake systems will be equipped with filters blocking radioactivity.
Requirements for power air conditioning systems:

- avoid the spread of fire through air conditioning tubes;
- ensure air supply in protected escape ways in case of fire.

Radiation control shall ensure monitoring of radiation in the Interim Storage Facility, control of the irradiation of persons, measuring of surface contamination of objects leaving the controlled zone, measuring surface contamination of persons when leaving the controlled zone, measuring surface contamination of and absorbed dose rate for vehicles entering/leaving the building.

When the technical solution involves **wet** storage of SNF (option No. 1) HVAC systems shall ensure ventilation and hot air heating for the entire facility. HVAC systems shall meet the following requirements:

- to ensure conditions for radiation protection in the site of the ISFSF and the surroundings of the Interim Storage
- to provide the staff with proper working conditions (meet the required sanitary limits) and technological equipment for the ISFSF,
- to ensure internal and external safety from the activity liquidation aspect in areas with their possible occurrence.

Air conditioning systems are divided into entry, discharge and circulation systems. HVAC systems shall be designed to comply with the air circulation principle that the air shall flow from premises with lower activity to premises with higher activity. In premises with activity negative pressure shall be maintained compared to the surrounding environment.
The discharge HVAC systems for ventilation of premises with detected activation shall discharge the air through filters blocking the activity in the ventilation chimney. The chimney is equipped with a monitoring equipment to avoid leakage of activity to the surrounding air.
For both wet and dry SNF storage, there will be no air pollution exceeding the defined limits, whether from combustion processes (transportation of SNF) or by contamination of radioactive substances. In case of wet storage, the air from the facility will be filtered and then discharged to the surrounding air. In case of dry storage, natural ventilation will be applied in the storage hall.
For both dry and wet SNF storage, sewage water will be generated by the operating staff from personal sanitary needs and cleaning of the operation premises.
Those amounts will be negligible compared to the volume of sewage water generated within Jaslovské Bohunice site. Similarly, the environmental load will be negligible. Total estimated annual quantity of waste water from the facility (rainfalls, sanitary sewage water and technical water) is approximately 5500 m^3. No contaminated waste water will be generated from dry storage of SNF. Decontamination, if any, of the premises of the controlled zone can produce a negligible amount of water – max 30 m^3 a year.

No contaminated waste is generated by wet storage of SNF either. The cooling water flowing off the SNF casings in the cooling pool circulates in a closed loop. Purification of pool water and decontamination, if any, of the controlled zone premises can produce only small amount of water – max 300 m^3 a year.

Both dry and wet SNF storage will generate waste in an amount negligible compared to the amount of waste generated by the whole Bohunice site. Waste will be produced by service interventions by SNF storage staff. The amount of inactive waste (packages, spare parts, glass, plastic, packages from

chemicals, fluorescent lamps and conventional waste) generated a year is approximately 1 ton, while the amount of radioactive (personal protective equipment, decontamination means- approximately 5 m^3 for wet storage or 3 m^3 for dry storage.

None of the two types of SNF storage is a serious source of noise or vibrations which could be classified as significant in terms of the working environment. Neither the transportation will produce noise affecting the environment with noise exceeding the acceptable levels. The operation of the SNF storage will not produce any smell.

The principle underlying the technical solution of the SNF storage in terms of radiation protection is to minimise negative effects of the ionising radiation to the lowest reasonable achievable level considering the existing economic and social factors (ALARA principle, i.e. as low as reasonably achievable in relation to management of exposure of staff and population).

The upper limit that must not be exceeded, are exposure limits and limit values of the dose equivalent outputs, defined by the Act No. 355/2007 Coll. on protection, support and development of public health and on changes and amendments to certain acts as amended by later legislation and Directive of the Slovak Government No. 345/2006 Coll., on basic safety requirements for the protection of health of employees and population from ionizing radiation and Decree of the Ministry of Health SR No. 545/2007, defining detailed requirements for radiation protection during activities resulting in irradiation and activities important in terms of radiation protection.

Assessing the impact of operation of the present ISFSF:

The Decision of the Public Health Authority of the SR No. OOZPŽ/7119/2011 dated 21.10.2011 permitted releasing radioactive substances from administrative control by their emission through ventilation chimneys of A1 NPP, Bohunice Processing Centre (BSC), ISFSF. The ventilation chimney of facility 840 (Interim SNF Storage Facility) has assigned an annual limit for combination of radionuclides (^{51}Cr, ^{59}Fe, ^{58}Co, ^{95}Zr, ^{103}Ru, ^{106}Rh, ^{141}Ce, ^{124}Sb, ^{95}Nb) including further radionuclides detected through monitoring – $3{,}00.10^8$ Bq. In order to summarize and to assess the impact on the dose loading, a monitoring obligation has been defined for: ^{90}Sr, radionuclides emitting alpha radiation ^{238}Pu, $^{239+240}$Pu, ^{241}Am and tritium. In 2013 Interim SNF Storage Facility contributed to gas emissions in minimum amount, markedly below the defined limit.

Interim SNF Storage Facility	Limit	Actual 2013	Limit drawing percentage
Combination of radionuclides	$3.00.10^8$ Bq	$0.266.10^6$ Bq	0.091 %
^{90}Sr	-	5.807 kBq	
Radionuclides ^{238}Pu, $^{239+240}$Pu, ^{241}Am	-		
tritium	-	2.043 GBq	

Evaluation of operations of all nuclear facilities and the gas and liquid emissions released therefrom in 2013 amounted to $1.47.10^{-8}$ Sv (limit 3200.10^{-8} Sv) dose load per inhabitant. Upon completion of storage capacities, emissions in the atmosphere are not expected to be increased significantly considering the effectiveness of filtering systems upon wet storage and hermetic storage boxes used for dry storage.

Evaluation of cumulative effects:
The nuclear facility in Jaslovské Bohunice is operated by 2 companies:

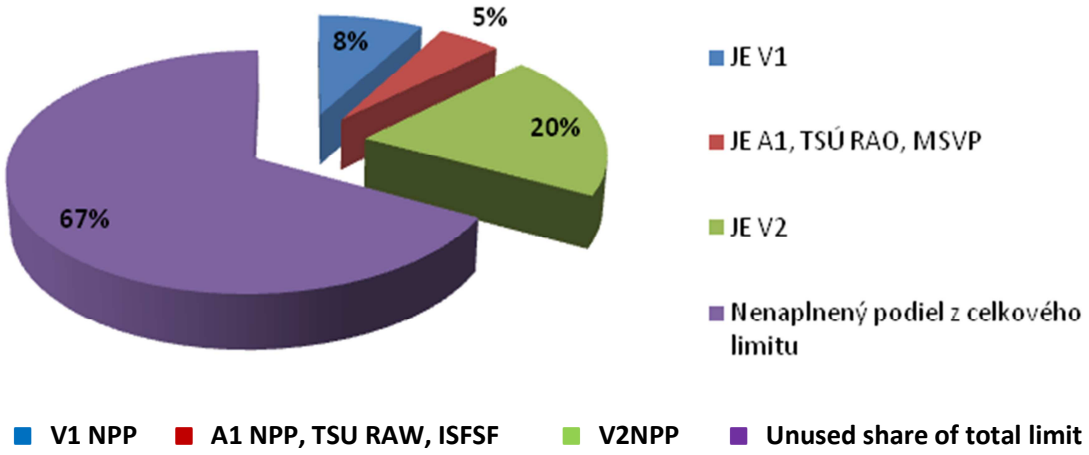
- SE, a.s. – nuclear power plant V2
- Jadrová a vyraďovacia spoločnosť, a. s.:
  - ✓ nuclear facility Technologies for Processing and Treatment of Radioactive Waste (Technológie pre spracovanie a úpravu RAO),
  - ✓ nuclear facility Interim SNF Storage Facility (storage of fuel assemblies from V1, V2

and MO 1&2 NPPs)

– decommissioning of two nuclear facilities:
  - ✓ nuclear power plant A1,
  - ✓ nuclear power plant V1.

Protection of the population from ionizing radiation by Act No. 355/2007 Coll. and by the Directive of the Slovak Government No. 345/2006 Coll. The Directive of the Slovak Government No. 345/2006 Coll. implies that nuclear facilities can release radioactive substances to the surrounding air and to surface waters if it is guaranteed that the effective dose resulting from these emissions for the relevant critical group of inhabitants do not exceed 250 μSv per calendar year. This requirement has been guaranteed through limits assigned to each nuclear facility by the Public Health Authority of the Slovak Republic (PHA SR). The limit of effective dose caused by radioactive substances from V2 NPP per representative person from among inhabitants equals to 50 μSv/year. Nuclear facilities of JAVYS, a.s. release only small percentage of permitted gas emission and liquid emission limits to the surrounding environment. The purpose of the emission limit values is to ensure that sum of emissions of radioactive substances in the environment from all sources in the location under both normal and specific operating terms reach levels ensuring that operation of the nuclear facilities do not cause exceeding of the annual radiation limit per 1 individual inhabitant equalling to 12 μSv/year for Technologies for Processing and Treatment of Radioactive Waste (TSÚ RAO), A1 NPP and Interim SNF Storage Facility and 20 μSv/year for V1 NPP nuclear facilities as a result of radioactive emissions to the atmosphere and hydrosphere. When detecting the dose load per inhabitant, radioactive emissions are considered as a whole – including atmosphere and hydrosphere emissions. Limit levels of radioactive emissions have been defined by decisions of the PHA SR and are stated in limits and terms for each nuclear facility (TSÚ RAO, A1 NPP, Interim SNF Storage Facility, V1 NPP), approved by the Nuclear Regulatory Authority of the Slovak Republic.

The proportion of limits for each nuclear facility in Jaslovské Bohunice in total limit as per the Directive of the Slovak Government No. 345/2006 Coll. is as follows:



Considering the aforementioned distribution of limits, sufficient reserve and minimum contribution to emissions upon completion of the SNF storage capacity it can be concluded that no significant changes are assumed to occur when assessing the impact on the population compared to the present situation.

V. Generally understandable final summary

In Jaslovské Bohunice, Jadrová a vyraďovacia spoločnosť, a.s. operates facility No. 840 "Interim Spent Fuel Storage Facility" – a nuclear facility that serves for storage of spent nuclear fuel from V1 NPP which is in the process of decommissioning and from nuclear power plants presently operated in the Slovak Republic.

The notification of the change in the proposed activity describes the intended changes in the existing activities – completion of spent nuclear fuel (SNF) storage capacity at Jaslovské Bohunice location.

The Petitioner Jadrová a vyraďovacia spoločnosť, a.s. seated at Tomášikova 22, 821 02 Bratislava, as the entity operating the nuclear facility for storage of SNF proposes completion of the SNF storage facility for 18 600 fuel assemblies. The expansion of the storage capacity is scheduled in two phases; in the first phase, the storage capacity will be extended by minimum 10 100 SNF assemblies and in the second phase by minimum 8 500 SNF assemblies.
Under Section 3, par. 9 of Act No. 541/2004 Coll., JAVYS, a.s. is a legal entity established and commissioned by the Ministry of Economy of the Slovak Republic ensuring storage of SNF in accordance with Section 10, par. 3 of Act No. 541/2004 Coll., stating that: "For the purpose of assurance of nuclear safety and to avoid unreasonable accumulation of radioactive waste and spent fuel, the licence holder, during the commissioning and the operation of nuclear installation, is obliged to submit its radioactive waste at the latest 12 months after their production and as regards the spent fuel without any delay after fulfilment of the requirements for its safe shipment and storage, to the legal entity as settled in Section 3 par. 9 for their further management."

Present situation
Interim SNF Storage Facility is a standalone building in JAVYS, a.s. site in Bohunice location. The nuclear facility is operated based on decision of the Nuclear Regulatory Authority of the Slovak Republic No. 444/2010 ensuring storage of SNF in four storage pools sized 23.4 x 8.4 x 7.2m. One of the pools serves as a reserve pool in case of necessity to remove fuel from permanently filled pools.
Spent fuel assemblies are stored under water level in storage pools in a vertical position in KZ-48 storage reservoir. The KZ-48 storage reservoir is designed to ensure subcriticality of the stored fuel and integrity of fuel assemblies. The water ensures removal of decay heat from the spent fuel and together with the concrete walls, it provides both shielding and a proper biological protection from radioactive radiation.
The present total storage capacity of the Interim SNF Storage Facility after renovation and seismic retrofitting is 14 112 fuel assemblies, which is sufficient for storage of all spent nuclear fuel generated during operation of units 1 and 2 of V1 NPP and 3 and 4 of V2 NPP. Presently it is filled to approximately 80% of the free storage capacity, which is sufficient until 2022.
Proposed situation
The completion of SNF storage facilities to receive the expected amount of spent fuel, which is, based on the assumed generation of SNF from operated nuclear power plants in Slovakia defined as minimum 18 600 fuel assemblies (FA), can be done at the site of JAVYS, a.s. in Jaslovské Bohunice in two phases of construction.
Considering the existing operation of the Interim SNF Storage facility it is assumed that storage premises will be built including a transport corridor to interconnect it to the present building to the Interim SNF Storage Facility. Besides the zero scenario (the present situation) proposed were 3 optional technology solutions for SNF storage:

1. Expanding the SNF storage facility by wet storage – completion of the storage capacity of the SNF storage pools and extending the present building of the Interim SNF Storage Facility using the present KZ-48 storage reservoirs for 48 SNF assemblies.

2. Expanding the SNF storage facility by dry storage - with building interconnection to the present building of the Interim SNF Storage Facility using transporting and storage containers for maximum 84 SNF assemblies placed on a hard surface in the storage hall of the SNF storage.

3. Expanding the SNF storage facility by dry storage - with building interconnection to the present building of the Interim SNF Storage Facility using storage containers (canisters) for maximum 85 SNF assemblies placed in ferro-concrete storage modules of the SNF storage.

The advantage of the local solution in Jaslovské Bohunice is mainly the use of the possibility to move the SNF inventory from the wet interim storage to a dry interim storage using proper package set for the selected storage technology, followed by wet storage of SNF generated by operation of units, after it is partially cooled in the SNF storage pool.

Proposed options:

1. Expanding the SNF storage facility by wet storage – completion of the storage capacity of the SNF storage pools and extending the present building of the Interim SNF Storage Facility using the present KZ-48 storage reservoirs for 48 SNF assemblies.

To increase the storage capacity by total 18 600 FA as required, 4 storage pools need to be built including the related technology and extension of the transport pool. When considering the building interconnection with the existing Interim SNF Storage Facility in Jaslovské Bohunice, the plan under consideration is to use the existing storage reception hall including the existing technology and sanitary installations necessary for operation of the storage (sanitary loop with change rooms and sanitary facilities, offices and control room for radiation control). The incoming fuel would be stored similarly to the presently used system – in KZ-48 compact reservoirs.

2. Expanding the SNF storage facility by dry storage - with building interconnection to the present building of the Interim SNF Storage Facility using transporting and storage containers for maximum 84 SNF assemblies placed on a hard surface in the storage hall of the SNF storage.

The technical solution of completion of the SNF storage facility involves building an interconnection with the existing Interim SNF Storage Facility. Under this option, the company would use transport and storage containers, which could be made either from metal or concrete. It is assumed that the fuel would be stored in the building which is primarily designed for protection of containers from climatic effects. The design of the building enables passive removal of heat from the surface of the storage containers.
Further biological shielding is only a secondary function necessary solely for requirements, if any, to minimise the dose for employees at the site and for civil population.
Vertical metal and/or concrete containers will be placed on the basement slab in the storage hall on or below the ground level. The containers will be relocated directly to the storage part of the interim storage facility.
The heat generated by the stored SNF can be removed from the containers by natural ventilation with the cooling air drawn in through openings around the lower part of the walls, and with the air outlet led through the roof.
The double-purpose package set (typically a container) has been designed and approved for storage and transportation of SNF for the given fuel type and parameters.

3. Expanding the SNF storage facility by dry storage - with building interconnection to the present building of the Interim SNF Storage Facility using storage containers (canisters) for maximum 85 SNF assemblies placed in ferro-concrete storage modules of the SNF storage.

The storage system in building structures (“the vault system”) is intended as an underground ferro-concrete cell-type structure. The heat is removed by natural air circulation through input and output inner cell walls and the air duct. Shielding is provided by the design of the storage cell. Each of the storage cells contains several metal canisters with SNF stored inside. Although the modular structure enables gradual expansion of the storage capacity, owing to restrictions on the unbuilt area, it is considered the storage capacity will be extended by making a rank by two, which would make it possible to use the modular structure in the third phase.
The vertical metal canisters are placed in concrete modules on bases adapted for circulation of cooling air and preventing accumulation of condensed water. The upper part of the canisters is equipped with a robust plug installed to the upper arched structure which is designed to resist the load applied during embedding the canister in the cell or in case that a heavy thing falls inside the storage premises

In case of dry storage (options No. 2 a 3) fuel assemblies are stored in a dry inert atmosphere. Containers and/or canisters shall ensure the following key functions:

- safe blocking of radioactive substances;
- ensuring subcriticality of the stored fuel;
- cooling of fuel and removal of decay heat;
- shielding;
- protection of spent fuel assemblies from external effects and risks.

Besides coverage of the fuel assemblies, the body of the container with a double closure system prevents from leakage of radioactive substances to the surrounding environment.
Subcriticality of the stored spent fuel assemblies is ensured by the geometric placement of the assemblies in the container (canister). Typically, the heat released during storage is removed by passive air circulation.

Assessment of impact on the environment

The changes in the proposed activity **are not assumed to have any impacts** exceeding state borders. The present operation of the Interim SNF Storage Facility neither has any impact on the neighbouring countries nor will the completion of the storage capacities using wet or dry technology will have an impact exceeding the state borders.
Details of condition of the environment in the surroundings of nuclear facilities in Jaslovské Bohunice location were described in reports on assessment of impact on environment prepared for the proposed activity "JAVYS, a.s. Radioactive Waste Processing and Treatment Technologies in Jaslovské Bohunice location", "2nd Phase of V1 NPP Decommissioning", which have been published recently and the activities have been discussed in public.
Effects of nuclear facilities operated in Jaslovské Bohunice location is subject to monitoring in accordance with the approved monitoring program and the results of the monitoring are summarised in report named *"Radiation protection in JAVYS, a.s. and the impact of JAVYS, a.s. site on the surroundings"* issued for every calendar year. Effects not resulting from ionizing radiation are assessed in the document *"Environmental Report"* (water management, air protection, waste management and other components of the environment) for each passed calendar year
As the Interim SNF Storage is a non-manufacturing site, the environmental impact of the operation, such as noise, dust, radiation and sewage water and waste generation, will be negligible.

SNF storage does not generate any waste water from technology, there is only water from surface run off and sewage water from sanitary facilities used by the service staff. Wet storage assumes production of waste water from purification of pool water and decontamination of the controlled zone premises – max 300 m^3 a year.

Both dry and wet SNF storage will generate waste in an amount negligible compared to the amount of waste generated by the other nuclear facilities at Bohunice site. Waste will be produced by service interventions by SNF storage staff – inactive waste, such as packages, spare parts, glass, plastics, packages from chemicals, fluorescent lamps and conventional waste generated a year is approximately 1 ton, while the amount of radioactive waste (personal protective equipment, decontamination devices)- is approximately 5 m^3 for wet storage or 3 m^3 for dry storage.
Protection of the population from ionizing radiation by Act No. 355/2007 Coll. and by the Directive of the Slovak Government No. 345/2006 Coll. The Directive of the Slovak Government No. 345/2006 Coll. implies that nuclear facilities can release radioactive substances to the surrounding air and to surface waters if it is guaranteed that the effective dose resulting from these emissions for the relevant critical group of inhabitants do not exceed 250 μSv per calendar year. This requirement has been guaranteed through limits assigned to each nuclear facility by the Public Health Authority of the Slovak Republic (PHA SR). The purpose of the emission limit values is to ensure that sum of emissions of radioactive substances in the environment from all sources in the location under both normal and

specific operating terms reach levels ensuring that operation of the nuclear facilities do not cause exceeding of the annual radiation limit per 1 individual inhabitant equalling to 12 μSv/year for Technologies for Processing and Treatment of Radioactive Waste (TSÚ RAO), A1 NPP and Interim SNF Storage Facility and 20 μSv/year for V1 NPP nuclear facilities as a result of radioactive emissions to the atmosphere and hydrosphere.
Completion of SNF storage capacities in J. Bohunice location does not assume changes in the presently defined limits.

VI. Annexes:

1. Information as to whether the proposed activity has been assessed under the existing law; if so, number and date of the final opinion shall be stated, or a copy thereof shall be provided:
   Storage of SNF was assessed as a part of assessment of activities "Seismic retrofitting and extension of storage capacity of the Interim SNF Storage Facility at Bohunice location", on which a final opinion was issued by the Ministry of Environment on 19.2.1997.
2. Maps of broader relations designation of the position of the change in the proposed activity in the municipality and in relation with the surrounding build up area
3. Copy of an entry from the Land Register
4. Opinion of the competent nature and landscape protection authority
   The storage capacities will be extended within the site of JAVYS, a.s. and will not interfere to area protected under special regulations.
5. Opinion of the competent land-use planning authority, as to whether the change in the proposed activity complies with the existing ground plan documentation valid for the given territory
   The SNF storage capacities will be extended within the guarded site of JAVYS, a.s. and it does not require any changes or amendments to the existing land-use planning documentation.
6. Documentation to the change in the proposed activity
   Decision of the Nuclear Regulatory Authority of the Slovak Republic No. 444/2010

VII. Date of preparation: 12.06.2014

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