RADIOACTIVE WASTE PROCESSING AND TREATMENT TECHNOLOGIES BY JAVYS, a.s.

AT

JASLOVSKÉ BOHUNICE LOCATION

Plan

pursuant to Act of NC SR No. 24/2006 Coll.

as amended

(Brief Summary)

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ABBREVIATIONS AND SOME TERMS:

AC	Air-conditioning
ADR	European Agreement Concerning the International Carriage of Dangerous Goods by Road
ALR	Agricultural land reserves
BL	Bituminisation line
BRAWTC	Bohunice Radioactive Waste Treatment Centre
CCTF	Contaminated concrete treatment facility
CSSF	Contaminated soil sorting facility
DBL	Discontinuous bituminisation line
DN	Decontamination node
EBO	Bohunice Power Plant
FCC	Fibre-concrete container
FLR	Forest land reserves
FP LRAW	Final Processing of Liquid Radioactive Waste
FTF	Facility for the treatment of spent nuclear fuel aimed for transport
HC	Hot chamber
JAVYS, a. s.	Jadrová vyraďovacia spoločnosť, a.s. (Nuclear Decommissioning Company)
LCDL	Large-capacity decontamination line
LRAW	Liquid radioactive waste
MoH SR	Ministry of Healthcare of the Slovak Republic
MSK-64	Macro-seismic 12-degree scale (Medvedev, Sponheuer, Karnik)
NC SR	National Council of the Slovak Republic
NDB	New draining bed
NPP, NPF, NF	Nuclear power-plant, nuclear power facility, nuclear facility
NRA SR	Nuclear Regulatory Authority of the Slovak Republic
NRAWR	National Radioactive Waste Repository
TCLSF	Treatment of cases from the long-term storage facility
PHA SR	Public Health Authority of the Slovak Republic

PS	Polluting substances
RA	Radioactive
RAS	Radioactive substances
RAW	Radioactive waste
RAWPTT	Radioactive waste processing and treatment technology
RC	Radiation control
RP	Radiation protection
SE a. s.	Slovenské elektrárne a.s.
SE-EBO	SE a.s., Atómové elektrárne Jaslovské Bohunice, závod ((SE a.s., Mochovce Nuclear Power Plant)
SFF	Sludge fixation facility
SRAW	Solid radioactive waste
UHG	Underground high-pressure gas-holder
VICHR	Vitrification facility
WWTP	Waste water treatment plant

DOWTHERM – organic cooling medium for spent fuel elements;

CHROMPIK – inorganic cooling medium for spent fuel elements;

IONISING RADIATION – radiation that transmits energy in the form of particles or electromagnetic waves with a wavelength of up to 100nm or a frequency of 3.1015Hz and higher, with the ability to create ions directly or indirectly;

IRRADIATION – exposure to the effects of ionising radiation;

NATURAL SOURCE OF IONISING RADIATION – source of ionising radiation of natural earth or cosmic origin;

RADIATION PROTECTION – protection of people and the environment against irradiation and its effects, including means to ensure such protection;

RADIOACTIVE CONTAMINATION – contamination of any material, surface, environment or individual with radioactive substances. In the case of a human body, radioactive contamination means external skin contamination and internal contamination irrespective of the way of radionuclides intake;

RADIOACTIVE SUBSTANCE – any substance containing one or more radionuclides whose activity, weight activity or volume activity is not negligible from the point of view of radiation protection;

RADIOACTIVE EMITTER – radioactive emitter whose activity and weight activity exceed the values stated in Annex No. 2 to Government Decree No. 345/2006;

RAW PROCESSING – activity aimed to separate radionuclides from radioactive waste, change their composition and reduce their volume with the aim to enhance the safety and economic efficiency of their treatment;

ARTIFICIAL SOURCE OF IONISING RADIATION – source of ionising radiation other than the natural one;

RAW TREATMENT – activity leading to an output in the form of packed radioactive waste prepared in compliance with the requirements for safe handling, storage, transport and storage.

INTRODUCTION

The technology for RAW processing and treatment at the Jaslovské Bohunice location was created and completed gradually, and in some cases it initially comprised experimental facilities.

Some parts of the technology were designed to ensure the process of treatment of RAW produced during the decommissioning of A1 nuclear power plant (the non-renewal of operation of the crashed power plant was decided by Resolution of the Government of CSSR No. 135 of 1979), which is currently at stage II. The beginnings of the process of approval of the principal facilities date back to the period prior to the validity of Act of NC SR No. 127/1994 Coll. on Environmental Impacts Assessment, e.g. Bohunice RAW Treatment Centre in 1993, fragmentation and decontamination line in 1987, etc.

Throughout their existence, the compound of operating units and parts of technology, as well as the operating units and parts of technology as such have gradually developed or have been adapted to the required purposes and demands, as a result of which many of them have gone through a series of changes and adjustments. At present (or after the last changes applied—for more details see Chapter II.8), this technology and workstations for RAW processing and treatment are able to fully execute their function in the treatment of RAW produced not only during the decommissioning of A1 NPP and the operation of nuclear power plants in the SR, but also in the decommissioning of V1 NF and the treatment of institutional RAW produced outside of nuclear power plant facilities.

In spite of the fact that some parts of the RAW processing and treatment technology were assessed under the process of assessment of stage I of the A1 nuclear facility implementation and of the condition after completion of stage I, some parts of the technology and workstations did not have the current form at that time, or it was not possible to assume their precise form at that time, and hence to make a complete assessment of their environmental impacts.

Since, as has already been mentioned, the current form of the given technology compound as such is optimised and stabilised, the proponent, upon consideration and consultations with the competent and approving authorities, has initiated a joint process of assessment of the proposed activity´s environmental impacts and impacts on the population.

I. BASIC INFORMATION ABOUT THE PROPONENT

1. Name

Jadrová a vyraďovacia spoločnosť, a.s.

2. Identification Number

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II. BASIC INFORMATION ABOUT THE PROPOSED ACTIVITY

1. Title

RADIOACTIVE WASTE PROCESSING AND TREATMENT TECHNOLOGY BY JAVYS, a.s. AT JASLOVSKÉ BOHUNICE LOCATION

2. Purpose

The purpose of the assessed activity is to operate a set of radioactive waste processing and treatment technology by JAVYS, a.s. located at Jaslovské Bohunice.

This technology serves for the processing and treatment of low and medium activity RAW produced during the decommissioning of A1 NPP, which is currently at stage II, and for V1 NF decommissioning (currently at stage I), as well as for RAW produced from the NPP facilities and from various fields of human activities, such as research, medicine, etc. (so-called institutional radioactive waste).

In this regard, the works executed at present mainly focus on the liquidation of the original, currently non-operated technological power plant facilities (including production unit), and of building structures after vacation of the facilities; handling of contaminated soil and concrete; treatment of cases from the long-term storage facility using chrompik cooling medium for fuel elements and its fixation; gradual purification of the organic cooling medium for fuel elements (dowtherm) and its incineration; processing (concentration, cementing) of historic liquid RAW; sorting, treatment and processing of historic solid RAW; and treatment and processing of solid and liquid RAW produced in the process of decommissioning with the aim to store the processed and treated RAW, fixed in fibre-concrete containers, at the NRAWR in Mochovce.

The core part of the designed technology set is the facility „RAW processing and treatment technology“, which principally consists of the Bohunice RAW Treatment Centre (BRAWTC) comprising a facility for the thickening of liquid radioactive waste, a facility for the sorting of solid RAW, an incinerator of solid RAW and liquid organic RAW, a facility for high-pressure RAW pressing, and a cementation facility for final covering of processed RAW with a cement mixture in fibre-concrete containers. In addition, this nuclear facility includes bituminisation lines, an active waste water treatment plant, and other units for RAW treatment. This RAW treatment technology set also includes parts of technology currently used for executing specific tasks related to RAW treatment under A1 NPP decommissioning, which will be later shifted to the RAWTPT nuclear facility.

3. User

Jadrová a vyraďovacia spoločnosť, a.s.

Tomášikova 22
821 02 Bratislava

4. Character of the Proposed Activity

It is an existing activity in the given location which can be classified, pursuant to Annex 8 to Act No. 24/2006 Coll. on Environmental Impact Assessment and on Changes and Amendments to Certain Laws (as Amended), as follows:

Chapter 2 Power industry

Item 10 Facility for the processing, treatment and storage of medium- and low-active waste from the operation and decommissioning of nuclear power plants and from the use of radionuclides

The proposed activity as such is subject to mandatory assessment without limits.

The proposed activity has been submitted to assessment as a single option. The Proponent asked for abandonment from the alternative solution by letter No. 2012/12343 of 09 August 2012.

The Proponent justified this request with the fact that due to the specific character of the situation (refer to Introduction) it makes no sense to deal with another option of the given activity, since the activity is based exclusively on approved technology that has already proven its suitability and optimum nature of the used procedures, as well as its ability to comply with the set limits, and from the point of view of space is an activity the operation of which is tied to the location of nuclear facilities which are either in operation or under the decommissioning process.

5. Location of the Proposed Activity

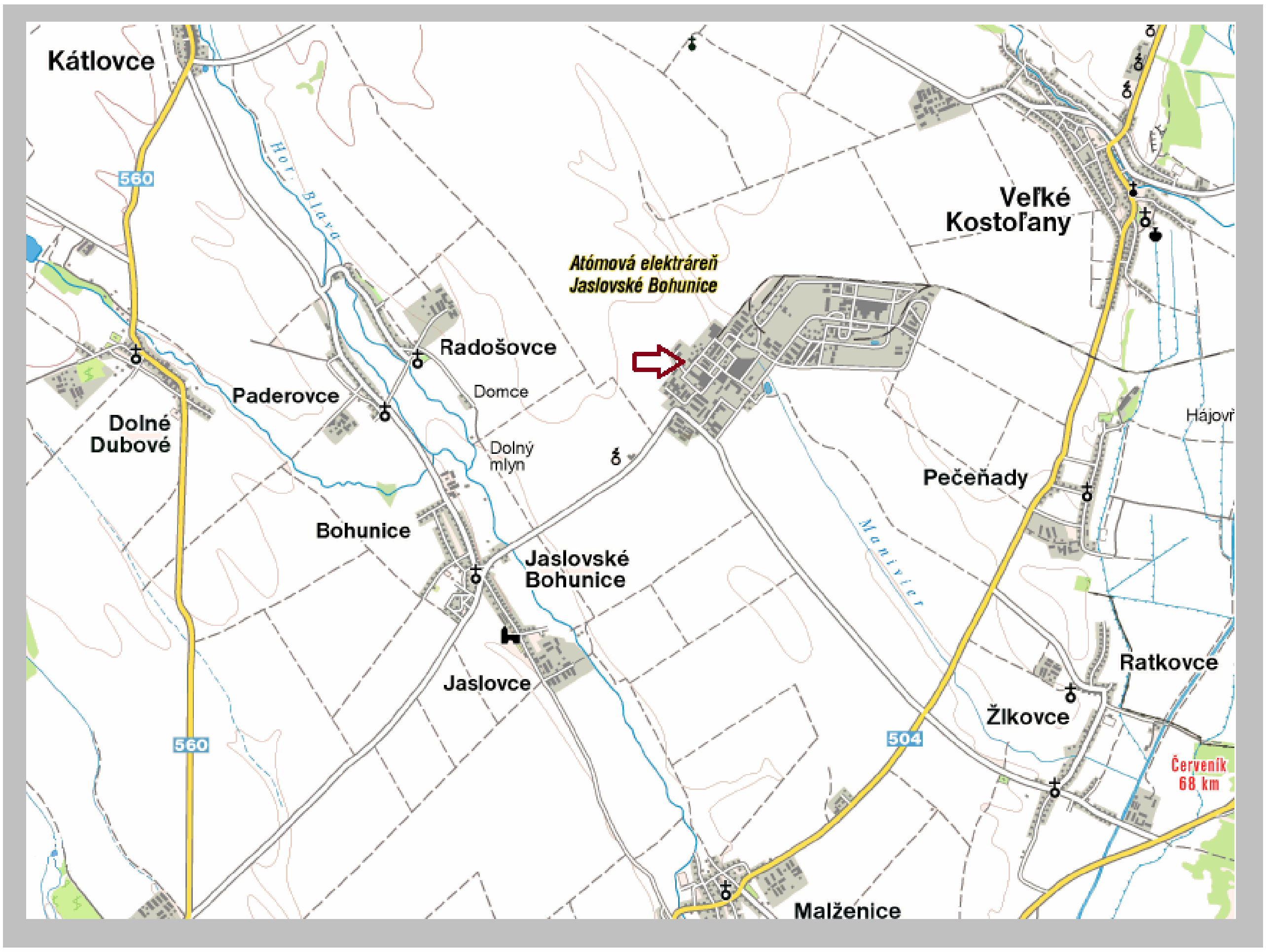
Region: Trnava
District: Trnava
Municipality: Jaslovské Bohunice
Cadastral territory: Bohunice

Building no. ***Plot no.***

30	704/56
32	704/55
34	704/54
46	704/57
41	704/65, 704/68
44/10	704/62, 704/69, 704/70
44/20	704/96
808	704/99
809	704/67
28	704/66
723	701/37

The buildings in which the RAW processing and treatment facilities are located are situated within the A1 NPP area (currently in the process of decommissioning) north-west from the buildings of the principal production unit which comprises other pieces of technology for RAW processing and treatment that fulfil tasks related to A1 NPP directly on site.

6. Overview of the Proposed Activity Location



Legenda: orientačné označenie umiestnenia činnosti
Legend: Indication of the activity location

7. Date of Start and End of Construction and Operation of the Proposed Activity

Since the main reason for the gradual implementation of the RAWPTT as the centre for RAW processing at Jaslovské Bohunice location was the need to process and treat radioactive waste from the decommissioning of A1 NPP (the non-renewal of the A1 NF was decided by Resolution of CSSR Government No. 135 of 1979), and from the operation of V1 and V2 NPPs and their subsequent decommissioning, the decommissioning will not take place before the second half of this century (the decommissioning process is expected to terminate in 2057).

Stage II of A1 NPP decommissioning, after which three vacant buildings will remain in the A1 NPP area (reactor building, steam generators and an auxiliary building), is planned to terminate in 2016.
The assumed end date of operation of the individual parts of the decommissioning technology varies and depends either on the technical life-cycle and the time period during which they are in operation, or on their wear-out, which is influenced by the intensity and remaining demands for their use. For example, the expected life-cycle of VICHR is approx. ten more years, the life-cycle of the parts of technology in building no. 41 is approx. 25 more years, while the life-cycle of DN in O-P corridor is approx. 15 more years and of FRAGIS II approx. 25 years, etc.

8. Brief Description of the Technical and Technological Solution

The assessed activity refers to the technology set for radioactive waste processing and treatment by JAVYS, a.s. located at Jaslovské Bohunice.

For the purposes of better orientation, this set of operations or operation units can be divided as follows with regard to their organisation and space:

A. <u>Technology set forming part of the nuclear facility „Radioactive Waste Processing and Treatment Technology (RWPTT)“</u>

- ✓ Bohunice RAW Treatment Centre (BRAWTC)
    - Concentration
    - Cementation
    - Sorting
    - Incineration
    - High-pressure pressing
- ✓ Bituminisation lines (BL)
    - Bituminisation lines PS 44 and PS100
    - Discontinuous bituminisation line (DBL)
- ✓ Waste water treatmentplant – unit in operation (WWTP)
- ✓ Metallic RAW processing (fragmentation line)
- ✓ Processing of AC filters
- ✓ High-capacity decontamination line

B. <u>Technology set for RAW disposal, which currently serves for the execution of specific tasks related to RAW disposal under the process of A1 NPP decommissioning and is located in the former operation buildings of A1 NPP</u>

- ✓ Sludge fixing facility (SFF)
- ✓ Contaminated concrete disposal site (CCDU)
- ✓ Contaminated soil sorting unit (CSSU)
- ✓ Sorting equipment in building no. 44/20
- ✓ Facility for gas-holders decontamination DEZAPLYN

- ✓ Facility for concrete blocks grinding and sorting

C. Technology set for RAW disposal, which currently serves for executing specific tasks related to RAW disposal under the process of A1 NPP decommissioning, located in the premises of the former principal production unit of A1 NPP

- ✓ Vitrification facility (VICHR)
- ✓ Facility for the treatment of spent nuclear fuel for transport purposes (FTF)
- ✓ New draining bed (NDB)
- ✓ Treatment of cases from the long-term storage facility (TCLSF)
- ✓ Decontamination node (DN) in O-P corridor
- ✓ Dowtherm purification facility
- ✓ SUZA DS – sludge processing facility
- ✓ Hot chamber (HC)
- ✓ Facility for the fragmentation of large-size metallic RAW
- ✓ Fragmentation facility FRAGIS I
- ✓ Decontamination facility FRAGIS II

A. The nuclear facility „Radioactive waste processing and treatment technology (RWPTT)“ includes:

8.1. BOHUNICE RAW TREATMENT CENTRE (building no. 808)

The Bohunice Treatment Centre processes RAW which can be divided into the following categories:

- ✓ combustible solid and liquid waste,
- ✓ pressable solid waste,
- ✓ non-combustible and non-pressable waste,
- ✓ concentrates,
- ✓ ion exchanger resins (sludge),
- ✓ other contaminated liquids and sludge.

Several processing facilities serve for the processing of such waste:

1. Facility for the thickening of liquid radioactive wastes – evaporator (PS 03)

The concentration facility thickens inorganic liquid RAW, which, after being condensed, is conducted to the dosing cementing tank in which it is further processed.

The breed condensate is used for the flushing of the concentration facility pipes or as a filler for the washer within the purification system for flue gases from the incinerator. After purification at the treatment plant in building no. 41 or no. 809, any excess amounts of breed condensate drained to the environment.

2. ***Cementation facility for the treatment of concentrates, saturated ion exchangers and sludge (PS 04),***

This facility enables RAW treatment for final storage, i.e. covering of processed RAW with a cement mixture in fibre-concrete containers (FCC).

RAW enters the dosage tank of the cementation line either directly (concentrates) from the concentration equipment, or through input tanks (resins – ion exchangers or sludge). RAW in its solid form is inserted directly to FCC and is covered with an active cement mixture prepared in the cementation equipment (oblique mixer). RAW is added to the oblique mixer with additives and cement according to proven recipes. Once thoroughly mixed, the cement product is drained to the fibre-concrete container. Containers with seasoned and hardened cement are transported to the National Radioactive Waste Repository in Mochovce.

3. ***Facility for the sorting of solid RAW (PS 05)***

This facility serves for waste sorting (in sorting boxes) as per RAW types and other methods of RAW processing and treatment. RAW are sorted to:

- pressable,
- combustible,
- non-pressable and non-combustible waste.

The facility also includes the possibility of RAW fragmentation, i.e. mechanic division of larger pieces.

4. ***Incinerator of solid RAW and liquid organic waste (PS 06)***

The furnace of the incinerator is designed as a shaft furnace with RAW dosing in its upper part. The incineration shaft does not contain any internal built-in components.

The incineration runs in two zones. In the lower zone, RAW is incinerated with a steam-air mixture, which ensures that the temperature in the burning material does not exceed 900°C and prevents clinker formation on the furnace walls. In the upper zone (above the incinerated material), sufficient air is supplied (operation unit with high oxygen levels) to ensure an incineration temperature of up to 1,050°C.

Flue gases from the incineration shaft are conducted away through the post-incineration chamber where they are incinerated at a temperature of 850 – 1,100°C. A DeNOx system installed in the post-incineration chamber injects water with a NOx-Out reduction agent.

There is a mixer at the post-incineration chamber outlet in which the flue gases get immediately cooled up to 340°C by water and compressed air injection, which substantially reduces the creation of dioxins (the most optimal temperature range for the production of dioxins is 600–350°C).

The cooled flue gases are subsequently purified in a two-step washing process and filtered using HEPA filters which trap radioactive particles with 99.9% efficiency.

Ash produced in the incinerator is reduced by a grinder. After being paraffined in the homogeniser, it is introduced in 200dm^3 MEVA barrels and transported for processing by pressing. The washing liquid from the flue gas washers is processed by cementation.

5. High-pressure RAW pressing (PS 08)

This facility serves for the pressing of sorted waste packed in 200dm^3 barrels. The barrel is pressed at a force of 20,000kN. The pressed material is inserted in fibre-concrete containers and covered with a cement mixture.

At present, some operating units or their parts are being ***reconstructed/renewed*** in BRAWTC. This process consists of the following works:

➢ *PS 03 (concentration)*

- installation of an auto-control heating system and heat insulation for the inlet tank of non-combustible RAW;
- to prevent crystallisation of borates, part of the evaporator´s pipeline route will be completed with heating and insulation (it will not be necessary to perform mechanical cleaning inside the system – within the evaporator pipelines), and the damaged parts will be replaced with new ones.

➢ *PS 04 (cementation)*

- to eliminate the clogging of the head neck and inlet of the oblique mixer, a new vessel with a hopper for the dosing of loose materials will be attached, replacing the original inlet, and a new cleaning lock with air vent of the head neck and fluidisation of loose materials at the outlet of the dosing vibration conveyors will be installed.
- the original mixer (equipment for the mixture preparation) will be replaced with new equipment.

➢ *PS 05 (sorting)*

- to improve the sorting process, the existing equipment will be completed and reconstructed to enable RAW sorting according to the activity level:
  - ✓ sorting box F-AB 10001 – adjustment of the side conveyor belt, installation of two probes to measure the dose rate power;
  - ✓ gamma scanner W 50 – hardware and software.

➢ *PS 06 (incineration)*

- RAW incineration node
  - ✓ change of fuel from heating oil to natural gas – instalment of gas burners and related connections (reason: fuel with lower specific emissions of ZL, requirement for increased performance as a result of ion exchangers incineration; contributing to better burning of flue gases);
  - ✓ change of LRAW incineration – extension of the range of incinerated LRAW (until recently, only Dowtherm and RA oils have been incinerated); a nozzle for the supply of ion exchanger mixtures will be installed, and the ion exchanger dosing will also be solved; the change of fuel will also require a modification in the supply of Dowtherm and RA oils which have until recently been dosed to oil burners; after the change, they will be supplied to the joint body of the nozzles of ion exchanger and combustible LRAW spraying).
- flue gas cooling and purification node
  - ✓ the new flue gas cooling system will ensure contactless heat transfer from one substance to another (flue gases/cooling water); this will require adjustments of the related pipeline;
  - ✓ the insertion of an auto-regeneration sleeve filter will enable separation of solid volatile particles from flue gases at 99 vol.% (reason: extension of HEPA filters life-cycle, reduction of washers´ burden);
  - ✓ the related new conveyor for ash trapped in the pipe cooler and sleeve filter, conveying the ash to the vibration separator and then to the homogeniser;
  - ✓ replacement of worn-out filtering columns of HEPA (aerosol) filters – fine filtering serves for the final purification of flue gases after being transported in wet washers and heated in the double-chamber mixer. The new filtering columns with identical technological parameters and measurements will be aligned in parallel (one filtering column in operation, another as a back-up).

With regard to the proposed adjustment, the construction and dispositional adjustments of the technological platforms will also be solved.

➢ *for PS 08 (VT pressing)*

- to capture unwanted materials, the operation unit will be equipped with an X-ray device for visual control of the contents of closed barrels and plastic bags.

The innovation of BRAWTC will also include:

- restoration of trolley transportation of FCCs on rails;
- adjustment of the roller way for barrels transportation;
- manipulator for speeding up the transport of 200l barrels which are to be pressed by a high-pressure press;
- crane control for inserting barrels into FCCs.

8.2. BITUMINISATION LINES (building 809)

The following pieces of equipment are installed in the bituminisation lines building:

- ✓ PS 44 – bituminisation line
- ✓ PS 100 – bituminisation line
- ✓ PS 44/2 – discontinuous (DBL)
- ✓ new RA waters treatment plant

This building is designed as four separate, mutually independent dilatation units. The building is interconnected with the Waste Water Treatment Plant and with BRAWPT via pipelines. The building has a special sewerage system which forms the basic system for trapping possible LRAW leaks.

The bituminisation equipment PS 44 and PS 100 represent mutually interconnected technological units.

The principal equipment of the ***bituminisation line PS 44*** is a film rotor evaporator whose main function is to evaporate water from the RAW concentrate and to coat the dry, fine crystals of dried salts with bitumen – a fixation medium. Both components (bitumen and concentrate) are dosed to the evaporator above the heated zone in tangential direction. The final product is put into 200dm^3 zinc-coated barrels which, after being closed, are placed in interim RAW storage facilities, or covered with a cement mixture in fibre-concrete containers.

The breed condensate, once purified by the de-oiling device and on the Vapex and carbon filter, is pumped to the active waters treatment plant for final cleaning.

The operation unit PS 100 (operating since 2000) consists of a similar bituminisation equipment as PS 44 which also includes facilities for the treatment of low-contaminated waste waters.

Water processing at the ***active waters treatment plant PS 100*** is performed by evaporation with natural circulation in the evaporator unit. After condensation, breed steams are purified at sorption columns. Once their volume activity is reduced below limit values, the condensate is gradually released to the environment. When optimum concentration is reached, the condensed substance is processed by bituminisation at the bituminisation lines PS 100 and PS 44.
At present, the two lines are operated alternately.

Discontinuous bituminisation line (PS44/stage II) serves for the processing of RAW containing sorbents. The output product of the discontinuous bituminisation line is a bitumen product containing dried and bituminised ion exchangers and sludge.

The line is operated in campaigns, where each campaign consists of the following steps:

1. transport of sorbents to the bituminisation lines building and their preparation for processing;
2. separation of sorbents in batches;
3. drying of the separated solid phase in batches;
4. bituminisation of the dried substance and its insertion into barrels.

After hardening, the final product is transported to the BRAWTC and put into fibre-concrete containers.

The breed condensate produced is trapped in a tank. The sludge from the centrifugal machine is stored in the sludge tank equipped with a mixer, from which it is conducted to the waste water tanks via pumps, or is dosed in the drying equipment. The separated water clear of solid impurities is drained off and captured in the tank for treated water. The treated water can further be used to dissolve solid particles in the storage tanks or can be processed at a film rotor evaporator PS 44 or PS 100, or condensed in the circulation evaporator PS 100.

Note:
*In connection with the construction of the facility for bituminisation of sorbents, one of the original A1 NPP buildings has been refurbished to create storage capacities for interim storage of the DBL product. Building no. 723 (**Interim storage facility for fixed radioactive waste),** originally designed for storing materials for the bituminisation line, was refurbished to store solid radioactive waste or fixed RAW in packing units (approved by PHA SR Decision No. OOZPŽ/4618/2011).*
Approx. 800 MEVA barrels can be stored in the building. Only packing units whose dose rate power on the surface does not exceed 4mGy/hour can be stored in the building, while the total activity of packing units can not exceed 1.9TBq.

8.3. WASTE WATER TREATMENT PLANT (building 41)

The treatment plant provides for:
- ✓ receipt of RAW whose specific beta and gamma activity does not exceed the value of $3.7x10^6$ $Bqxdm^{-3}$ (i.e. low-active LRAW) and its pH is 6-8;
- ✓ LRAW storage in two storage tanks with a capacity of approx. $90m^3$;
- ✓ LRAW treatment with evaporation technology with final cleaning of breed condensates at the ion exchangers filtration station;
- ✓ pumping off the RA concentrate from the evaporator to store it before further processing at the bituminisation lines;
- ✓ storage of breed condensate from the evaporator in buildings 41, 808 or 809;
- ✓ storage of heating steam condensate from buildings 41 and 808 or. 809;
- ✓ controlled discharge of low activity waters to the environment after determining their volume activities through the SOCOMAN sewerage system.

Besides storage tanks for RA waste waters aimed for cleaning, a tank for capturing breed condensate, a tank for purified breed condensate, and storage tanks for heating steam condensate, the building also has a retention tank through which treated waste waters are discharged to the environment. Waters recovered from the A1 NPP area bedrock also flow through this tank.
Saturated ion exchangers from water treatment are stored in MEVA barrels in building 41, or are transported to the interim storage facilities.

8.4. METALLIC RAW PROCESSING UNIT (building 34) (under a separate assessment process)

This unit serves for the sorting, fragmentation, subsequent decontamination and release into the environment of metallic RAW, or for its safe storage until its deposition at the NRAWR Mochovce.

It consists of the following sections:

PS001 – Coarse fragmentation
PS002 – Fragmentation
PS003 – Coarse sorting
PS006 – KEMPER suction and filtration
PS007 – Dividing and jet-blasting
PS008 – Grinding of used electric cables

At ***PS003 Coarse sorting*** section, the dismantled material is sorted into categories according to the material composition and/or level of contamination. Subsequently, at ***PS001 Coarse fragmentation*** section, the material is divided by means of plasma or acetylene-oxygen equipment into pieces which can be further fragmented at the ***PS001 Fragmentation*** section and at ***PS007 Division and jet-blasting*** section to pieces with dimensions suitable for storage in 200dm^3 MEVA barrels or on transport pallets. On transport pallets, the material is either temporarily stored or is transported for further processing.

The material is moved from transport pallets to decontamination crates and is inserted into bowls at the large-capacity decontamination line. The metallic material placed in 200dm^3 MEVA barrels is stored in the storage premises.

Contaminated air from these sections of the unit is conducted away through the draft system equipped with three-step filtration to trap radioactive aerosols ***(PS 006 Suction and filtration).*** The KEMPER-type, system 9000 filtration equipment is used to trap pollutants in the form of dust particles produced during welding and thermic division of metals. Purified air is conducted to the central AC chimney of A1 NPP.

PS008 section processes used electric cables by removing their external insulation, grinding the cable and separating insulation and non-ferrous metals.

8.5. AIR-CONDITIONING FILTER PROCESSING FACILITY (PS 009)

PS 009 Air-conditioning filter processing unit is designed to process contaminated filters from the air-conditioning systems of nuclear facilities at Jaslovské Bohunice. This unit enables sorting and packing of waste as per types of RAW (metallic material from carbon steel, aluminium, paper and cellulose, wood, polyethylene, and polypropylene). After being packed and monitored, the sorted types of RAW are further processed. The equipment for the processing of AC filters from the air-conditioning system is currently at the stage of commissioning.

This unit consists of three technological sections:

- ✓ technological section for grinding and separation;
- ✓ technological section for separated crushed material pressing;
- ✓ sanitary node.

The first step is the grinding of AC filters. The next step is the division of the formed fragments (40x40mm) to pieces by a vibrator, from which the magnetic separator separates the metallic parts. The metallic parts are put into 200dm^3 MEVA barrels. The non-magnetic fragments are ground again (20x20mm), and the electro-dynamic separator separates from them particles with aluminium contents which are again placed in 200dm^3 MEVA barrels.
The other components of the crashed material (filtration fabrics, paper, plastics, and wood) are further processed depending on the level of contamination. In the case of higher contamination, these components are homogenised with anti-microbial additives and placed in 200dm^3 MEVA barrels which are processed by high-pressure pressing. In the case of lower contamination, the components are sorted to combustible and non-combustible parts. The combustible part is inserted in PE bags and transported in 200dm^3 MEVA barrels for

combustion. The non-combustible part is processed in a similar manner as components with higher contamination by high-pressure pressing.

8.6. LARGE-CAPACITY DECONTAMINATION LINE (LCDL, building 24) (under a separate assessment process)

This decontamination line represents a compound designed for decontamination of non-fragmented metallic materials. The LCDL consists of a set of bowls for various decontamination procedures:

- ✓ steeping bowl;
- ✓ chemical decontamination bowl;
- ✓ ultra-sound decontamination bowl;
- ✓ flushing ultra-sound decontamination bowl;
- ✓ drying bowl;
- ✓ electro-chemical decontamination bowl.

Besides this basic equipment, the line includes other related technological devices for the preparation and regeneration of decontamination solutions and treatment of sludge phases, as well as heating and air-conditioning systems.
At present, this operation unit is under a separate process of assessment due to modernisation aimed at increasing the processing capacity of the unit from 200t/year (year 2011) to 250t/year (in one-shift operation). The 50t/year increase of metallic RAW against the present will be due to metallic RAW from V-1 NPP.

B. The following facilities serve for the execution of specific tasks related to RAW treatment in the former operation premises of A1 NPP during its decommissioning:

8.7. SLUDGE FIXATION FACILITY (SFF)

SFF is a mobile facility for fixing radioactive sludge in various types of fixation matrices. This facility can be placed next to a sludge tank equipped with a sludge pumping system.

The sludge pumped to the SFF storage tank, after the proportion between the sludge solid particles and water has been determined, is drained to the working sludge tank from which it is put to a 200dm^3 MEVA barrel in required amounts according to the set recipe. Afterwards, the barrel is placed under the mixing unit in which the required amounts of loose reinforcing matrices (e.g. cement, aluminium silicate matrix SIAL, etc.) are dosed, and sludge homogenisation is performed using reinforcement matrices. After removing the blender and taking a sample, the barrel is put in a seasoning position. The solidified product, after covering the barrel, is transported to the BRAWTC to be inserted in a fibre-concrete container.

8.8. CONTAMINATED CONCRETE TREATMENT FACILITY (CCTF, building 44/20)

The purpose of contaminated concrete treatment is its decontamination to reach a surface contamination level of 0.3Bq/cm^2 as the limit value for release into the environment.

This facility consists of the following parts:
- ✓ CCTF containment which prevents free diffusion of RA substances in the form of dust particles and aerosols produced during the decontamination and sorting of contaminated concrete;
- ✓ several additional stands for the storage of contaminated concrete in barrels, or sorted "treated" concrete.

The containment is divided by a partition wall into two technological parts identical in size, each of them having two feed openings – a horizontal one and a vertical one.
The container has its own air-conditioning unit for the suction and cleaning of air from the working area. The sucked air (approx. 2,000m^3/h) is filtered (pre-filter + HEPA filter), and the outlet leads to the pipeline connected to the AC system in building 44/10 and BRAWTC.

The facility is divided into two operating units:
- ✓ handling of barrels with contaminated concrete – PS 01,
- ✓ handling of contaminated concrete blocks – PS 02

PS 01 includes a vibration sorting equipment oscillating in rectilinear motionwith sorting and hopper parts under which 200l MEVA barrels are placed on pallets and which sorts the crushed concrete material according to fragment size to:

- dust fraction (Ø up to 2.5cm) – considered as RAW;
- sorted crushed material (size exceeding 2.5cm) – the waste in MEVA barrels is measured in the central monitoring work station, and is subsequently either released to the environment, or is repeatedly sorted, or the barrel with the crushed material is processed at BRAWTC by pressing.

PS 01 includes an industrial vacuum cleaner with a preliminary cyclone separator with three levels of filtration (level I – cyclone separator to separate the coarse medium from fine medium; level II – main filter with automatic pneumatic hammering, consisting of four patron filters trapping fine dust of up to 3 microns; level III – outlet HEPA filter with 99.999% efficiency).

PS 02 contains concrete blocks decontaminated to a level allowing their manual release to the environment. PS 02 also includes a steel working grate which consists of eight segments of size 1,000x500 mm and 350mm high, on which concrete blocks are placed.

The following pieces of equipment are used:

- electric milling device with a socket to connect it to the vacuum cleaner in order to eliminate dust;
- manual high-performance diamond grinding device with electrical drive;
- electric cutting hammer for coarse division and straightening of concrete blocks.

After the decontamination is completed, the concrete block surface is monitored with the screening system.

The contamination of air at both workplaces is monitored and evaluated with a portable manual dust measuring device.

8.9. CONTAMINATED SOIL SORTING UNIT (CSSU)

This unit serves for the sorting of natural wet soil clear of stones and larger objects as per weight activity of ^{137}Cs (or other radionuclide) to three adjustable activity classes:

- up to 300Bq/kg,
- from 300 to 10,000Bq/kg,
- over 10,000Bq/kg.

The CSSU is an autonomous unit transportable by common means of transport, which only requires power feed.

CSSU consists of four inter-connected functional parts:

- soil preparation,
- soil transport for monitoring purposes,
- soil monitoring and sorting,
  (placed in an ISO container, which consists of a feed hopper, two monitoring probes and their shading, a conveyor, and an output grader; the soil from the feed hopper moves on the measuring belt under a couple of shaded LaBr detectors),
- transport of soil from the unit after monitoring and sorting.

8.10. SORTING FACILITY IN BUILDING 44/20

This facility is designed for the sorting of earlier solid RAW from A1 NPP which is stored in certified storage facilities of the main production unit (MPU).
The facility consists of a working platform on a rail track on which a sorting table is installed, and the platform can be moved all around the building. The plate of the sorting

table is made of stainless steel with elevated edges, i.e. it also fulfils the function of a catch bowl. The plate has a frame with three barrels for sorted material. The RAW to be sorted is conveyed to the sorting table plate where the operating staff sorts the waste with the necessary tools (plough-shares, collets, rakes) and puts it in barrels. The material is sorted into three categories: combustible, non-combustible – pressable, and small solid non-pressable. The operating staff is protected against the effects of RAW by means of a protective shield. The protection of staff against inhalation of RA substances is ensured by an effective suction device located above the sorted material.

8.11. FACILITY FOR THE DECONTAMINATION OF GAS-HOLDERS DEZAPLYN (building 28)

The facility consists of the following parts:

- ✓ Chemical unit of the underground high-pressure gas-holder (UHG)
- ✓ UHG high-pressure unit
- ✓ UHG spraying trolley
- ✓ UHG pumping unit
- ✓ UHG neutralisation unit
- ✓ UHG filtration unit
- ✓ UHG pneumatic unit
- ✓ UHG rail
- ✓ UHG main distributor frame

The chemical unit of UHG is stand-alone equipment used for the precise addition of the decontamination solution in the tank, to the outlet of which any equipment performing decontamination spraying can be connected.

The high-pressure unit feeds the spraying trolley or any other external device with high-pressure distilled water, low-pressure distilled water and a chemical solution.

The spraying trolley is equipment used to decontaminate gas-holders. The trolley moves on a track within a gas-holder and sprays its internal walls by means of nozzles.

The pumping unit serves for the pumping of used decontamination solutions and flushing water from UHG to the neutralisation unit or filtration unit in the corridor.

The neutralisation unit is used to neutralise used decontamination solutions.

The filtration unit filters the supplied liquid from mechanic impurities in several phases, and traps cobalt and caesium.
The output liquid from storage tanks is ready for further use in the decontamination process.

The pneumatic unit serves for the treatment of supplied air, i.e. it filters, removes sludge, regulates and then divides air into four circuits.

The UHG rail is installed inside the gas-holder to allow the spraying trolley to move on the rail precisely along the UHG axis.

8.12. CONCRETE BLOCKS GRINDING AND SORTING WORKSITE

This worksite ensures, by means of one piece of equipment (for all planned operations – demolition, fragmentation and grinding), the following works:

- demolition of building structures of up to 800mm in thickness,
- heavy demolition works of heavy-armed concrete structures of up to 800mm in thickness,
- processing of iron-concrete blocks of 900x500mm by grinding, with an optional output size of the ground fragments from 15 to 120mm,
- separation of iron reinforcements from ground iron-concrete,
- loading of iron-concrete blocks and crushed materials to trucks.

Since this equipment is easily movable (it has a wheel chassis with protection against tyre damage), it can be used in all buildings, including A1 NPP tanks.

C. The following parts of RAW processing and treatment technology are situated in the buildings of the former main production unit of A1 NPP:

8.13. VITRIFICATION FACILITY (VICHR)

The vitrification facility is used for the fixation of inorganic liquid RAO (chrompik – cooling medium for spent fuel elements) in a glass matrix after thickening the liquid RAW in the concentration evaporator (volume of 50dm^3).

After being purified in sorption columns, the breed condensate generated in the evaporator is pumped to the low-contaminated waste waters treatment plant for final treatment. The thickened concentrate is drained to the vitrification furnace where it is heat-treated with the addition of a glass matrix. The active hot-melt is drained to a metal mold (approx. 8dm^3 volume) and stored in an interim storage facility. The breed condensate from the vitrification furnace returns back to the process.

Saturated sorbents from breed condensate treatment can be treated by vitrification within the equipment. Other secondary RAW produced can be processed by standard processes on BRAWTC.

8.14. FACILITY FOR SPENT NUCLEAR FUEL TREATMENT FOR TRANSPORTATION PURPOSES (FTF)

The facility is currently used for the destruction of cases from the long-term storage facility (CLSF) using fixed sludge of cooling media (chrompik, dowtherm).

This sludge has been fixed together with the residues of spent nuclear fuel into a solid matrix at the bottom of the CLSF. Within the FTF equipment, the bottom part of CLSF with fixed RAW is separated from the empty upper part and inserted in an air-tight case. The upper part is fragmented in the CLSF treatment equipment.

8.15. NEW DRAINING BED (NDB)

This equipment was originally used to drain the cooling medium (chrompik III) from CLSF with fuel elements in case the fuel elements could not be removed. After draining the liquid phase of the cooling medium, the fuel element with a part of CLSF was closed into HP. Subsequently, the draining equipment was used for the draining of chrompik II from CLSF without fuel elements. The CLSF draining was performed by perforation of the CLSF wall with a prick, which did not allow the draining of the entire contents of the cases, since it was not possible to make a draining hole in the bottom part of CLSF.

After the method of perforation changed from a pressure prick to hole drilling, it is now possible to perform full draining of the CLSF.

The draining equipment adjusted in this way will be used to drain sludge phases from CLSF.

8.16. FACILITY FOR THE TREATMENT OF CASES FROM THE LONG-TERM STORAGE (FTCLS)

This facility is designed for the fragmentation of cases from the long-term storage facility used for the storage of spent nuclear fuel, since there was a leak of fissiles from nuclear fuel during storage. The cases show a high level of surface contamination, and it is necessary to decontaminate them to a level enabling their recasting or deposition at the National Repository.

8.17. DECONTAMINATION NODE (DN) IN O-P CORRIDOR (building 30)

The decontamination node in the O-P corridor was created for the purpose of decontamination of objects or dismantled parts of equipment which, due to higher level of contamination, cannot be decontaminated by the large-capacity decontamination line (at present mainly CLSF fragments).

The equipment consists of the following parts: electro-chemical decontamination bowl, ultra-sound decontamination bowl, portable decontamination bowl, decontamination table, absorption column, pipelines and suction ducts, cooling aggregate, and filtration unit.

8.18. DOWTHERM TREATMENT FACILITY (building 30, long-term storage premises, room no. 516)

This facility is used to reduce the specific activity of Dowtherm (organic cooling medium for spent fuel elements), which subsequently enables its processing by combustion in the BRAWTC incinerator.

The main part of the equipment is a shaded stainless steel (reaction) tank of 200 dm^3 with a mixer. The upper part has a hopper hole through which the tank is filled with the sorbent. A ball valve is located at the bottom part of the stainless steel tank with manual remote control (a pole) for the draining of activated inorganic sorbent to the 60dm^3 sheet barrel situated in the shaded trolley. The treated Dowtherm is pumped off by means of a pump with a suction pipe to the PK container I/DOW. The technological process is remote controlled and is monitored by means of a closed-circuit television.

The reconstructed SUZA-DS equipment is used for the fixation of saturated sorbents. Sorbents are fixed in the SIAL matrix.

8.19. SUZA DS – SLUDGE PROCESSING FACILITY

This facility was used for the selection and fixation of RA sludge from the long-term storage basin. The facility (fixation part) is currently used for the processing of saturated sorbents drained from the stainless steel tank of the facility for the purpose of Dowtherm treatment directly to the 60dm^3 barrel.

The facility consists of a pumping unit which was used to convey the mixture of RA sludge and cooling media from the basin to the barrel, a fixation unit – mixer, and a piece of equipment for pumping off the organic and water phase from the barrel.

8.20. HOT CHAMBER (HC)

The hot chamber (HC) is designed for remote performance of technological operations with high activity materials. The working space of HC is separated from the neighbouring rooms (including operation room) by thick concrete walls, with a built-in sight-hole from leaded glass in the case of the operation room. The working space is hermetically closed, and the internal walls are covered with stainless-steel polished sheet. The working space includes working equipment (fixing devices, milling devices, lifters, rotating devices, working parts of manipulators), radiation control devices, lighting and closed-circuit television.

The hot chamber is connected to the HC racking equipment by means of a draining system. During work with liquid RAW in the working space, a transport container is placed next to the HC racking equipment, which also fulfils the function of catching the contents.

The basic operations performed in the chamber include:
- ✓ cutting of materials and taking of samples,
- ✓ fixing and working of highly contaminated materials,
- ✓ handling of samples (inserting, taking out from containers),
- ✓ detailed visual inspection of objects;
- ✓ photographing of objects.

8.21. FACILITY FOR THE FRAGMENTATION OF LARGE-SIZED METALLIC RAW

This facility will serve for the fragmentation of large-sized metallic RAW from the dismantling of bearing structures of the fuel charging machines ZS I and ZS II in O-P corridor in order to transport them in containers for further processing in building 34, i.e. to the metallic RAW processing facility.

The proposed solution consists of creating an independent covered workstation with own suction and own sanitary node placed on wagon axles on rails in the O-P corridor to be able to vacate the space for other manipulations in the O-P corridor as needed, which, at the same time, will allow workstation mobility within the rail siding of JAVYS, a.s.

8.22. FRAGMENTATION EQUIPMENT FRAGIS I

It is a container used to store devices and tools designed for the liquidation of machines. This equipment includes a storage container, a decontamination table, a decontamination tank, shelves, air vent and a trash bin.

8.23. DECONTAMINATION EQUIPMENT FRAGIS II

This equipment serves for the decontamination of metallic RAW from the A1 NPP decommissioning (dismantled parts of non-operated facilities of A1 NPP). This facility is designed as a mobile container (currently located next to building 30 of A1 NPP) with the possibility of getting connected to the auxiliary systems of the building.

The equipment consists of an electro-chemical and ultra-sound decontamination bowl with accessories (devices for the preparation of decontamination solutions, power sources, ultra-sound, devices for secondary RAW treatment, handling tools, radiation control devices, air-conditioning).

After the level of contamination of the dismantled parts of equipment is reduced below the limit values (10^4 or 10^3Bq/cm^2), these parts are transported for further processing by LDL equipment. All pieces of equipment installed within FRAGIS II have shading, which ensures protection of the operating staff.

9. Justification of the Need to Implement the Activity in the Given Location

The installed technology for radioactive waste processing and treatment has been situated in the given location as a further logical step in the treatment of radioactive materials produced as waste by the nuclear facilities operated at the Jaslovské Bohunice location or during the decommissioning of nuclear facilities whose operation has already ended. At present, the nuclear facilities "A1 Nuclear Power Plant" (Stage II), and "V1 Nuclear Power Plant" (Stage I) are being decommissioned.

10. Total Costs

The activity has already been implemented and the installed technological equipment is being operated.

11. Affected Municipality

Municipality affected by the location of the facility:

Trnava District: Jaslovské Bohunice

Municipalities situated within the area and marked as affected for the purposes of this document:

Trnava District: Jaslovské Bohunice, Radošovce, Malženice, Dolné Dubové
Piešťany District: Veľké Kostoľany, Pečeňady, Nižná
Hlohovec District: Ratkovce, Žlkovce

12. Affected Self-Governing Region

Trnava Self-Governing Region

13. Affected Authorities

District Environmental Office Trnava
District Environmental Office Piešťany
District Environmental Office Trnava – Permanent Office in Hlohovec
Regional Public Health Office in Trnava
Regional Directorate of the Fire and Rescue Corps in Trnava
District Office Trnava, Civil Protection and Crisis Management Department
District Office Piešťany, Civil Protection and Crisis Management Department
District Office for Road Transport and Land Communications Trnava
District Office for Road Transport and Land Communications Piešťany

14. Approving Authority

Nuclear Regulatory Authority of the SR
Public Health Authority of the SR
Regional Environmental Office Trnava

15. Departmental Authority

Ministry of Economy of the SR

16. Type of Required Permit for the Proposed Activity under Special Regulations

The nuclear facility RAWPTT Jaslovské Bohunice as an operating facility currently disposes of all the required permits and consents, the final being the following:

- ✓ NRA SR Decision No. 498/2010 of 23 December 2010 on issuing the permit for the operation of the nuclear facility RAWPTT in Jaslovské Bohunice and for RAW treatment in the nuclear facility RAWPTT within the scope of the Pre-Operation Safety Report for RAWPTT, review No. 01 August 2010;
- ✓ PHA SR Decision No. OOZPŽ/7119/2011 of 21 October 2011, on permitting the activities causing irradiation (RAS release from administrative control by being discharged together with exhausts to the vent chimney of A1 NPP Jaslovské Bohunice; RAS release from administrative control by being discharged with waste waters to Dudvách and Váh Rivers; discharge of radioactive contaminated materials from A1 NF/NPP, RAWPTT, TWSF).

At the same time, the company JAVYS, a.s. as the operator disposes of all other permits and consents to the activities performed within the NPP Jaslovské Bohunice site which related to the given technology:

- ✓ Decision of the Regional Environmental Office KÚŽP-1/2006/00273/Fr of 13 July 2006 on water discharges into surface water courses (Váh, Dudváh), amended by KÚŽP-1/2007/00272/Šk of 27 June 2007 and decisions KÚŽP-1/2010/00465/Mj of 15 November 2010, KÚŽP-1/2011/00451/Gl of 27 September 2011 and AF1/2012/461/Mj of 18 September 2012
- ✓ Decision of the District Environmental Office Trnava No. G2011/02263/ŠSOH/Hu – Consent to hazardous waste treatment

17. Statements on the Expected Impacts of the Proposed Activity beyond State Borders

Pursuant to Art. 40, par. 1, letter b) of Act No. 24/2006 Coll. on Environmental Impact Assessment, the assessment of impacts reaching beyond state borders comprises such proposed activities to be implemented within the territory of the Slovak Republic and listed in Annex 13, or proposed activities listed in Annex 8 which can have a serious environmental impact reaching beyond the state borders,

Further to item 3 of Annex 13, "Facilities designed exclusively for nuclear fuel production or enrichment, spent nuclear fuel processing or storage, and radioactive waste deposition and processing" are subject to such assessment.

The technology and operating units described above meet the definition of RAW processing in accordance with NRA SR Decree No. 30/2012 Coll. on laying down the details of requirements for the processing of nuclear materials, radioactive waste and spent nuclear fuel, which defines radioactive waste processing as an activity aimed "to separate radionuclides from radioactive waste, change their composition and reduce the volume thereof in order to promote safety and the economic efficiency of radioactive waste treatment" (Art. 7).

Hence, in spite of the fact that the given technology and operating units represent, due to their nature, a source of minimum impacts affecting a limited area in the surroundings of the proposed activity location (refer to Chapter IV.7), the proposed activity is subject to international assessment pursuant to Act of NC SR No. 24/2006 Coll. on Environmental Impacts Assessment.

It should be mentioned in this regard that in connection with the plan of disposal of radioactive waste from stage II of A1 NPP decommissioning which assumed the RAW treatment procedures described above, the **European Commission,** in line with Article 37 of the Euroatom Treaty, issued an opinion dated 09 June 2009 which concludes that in respect of the given activity the Commission has come to the conclusion that the activity **is not**

expected to cause radioactive contamination of water, soil or air in another Member State either during normal operation or in the event of an accident of the described extent and scope (the full text of the opinion including accompanying report is available at the Proponent upon request).

III. BASIC INFORMATION ABOUT THE CURRENT STATE OF ENVIRONMENT OF THE AFFECTED AREA

1. DESCRIPTION OF THE NATURAL ENVIRONMENT INCLUDING PROTECTED AREAS

1.1. Definition of the Borders of the Affected Area

With regard to the characteristics of the natural conditions, "affected" (assessed) area means an area within an approx. 5km diameter with the centre at the location of the given RAW processing and treatment technology and A1 NPP decommissioning (for the reasons for choosing this diameter refer to Chapters IV.3.1. and IV.2.5.). The surroundings of the affected (assessed) area are the territory at a distance of up to 10-25km from the NF Jaslovské Bohunice site (based on the given issue).

From the point of view of socio-economic characteristics and population characteristics, the affected area represents the total of the cadastral territories of municipalities whose residential areas are situated within the affected area defined above.

1.2. Geomorphological Conditions

The given area is situated within the Trnavská pahorkatina highlands.

1.3. Geological Conditions

GEOLOGICAL STRUCTURE

From the geological point of view, the assessed area is located in the northern foreland of the Danube basin, in the Blatno depression.

ENGINEERING-GEOLOGICAL CONDITIONS

The determining feature for the area of the Jaslovské Bohunice NF compound is the presence of a thick (10-15m) layer of eolic sediments – loesses and loess loams.

SEISMICITY

The basic seismological data for Jaslovské Bohunice NF location was obtained in the period 1969–1970, and the seismic burden of buildings was determined at 7º of the MCS scale (Mercalli – Cancani – Siebert).

1.4. Climate Conditions

The climate of the affected area can be characterised as a lowland, predominantly warm climate; the territory is part of the A3 climate zone (warm, moderate dry climate with moderate winters).

1.5. Hydrological Conditions

The given area is part of the river basin of the Dudváh lowland river which joins the Váh river approx. 16km SSE at Siladice municipality.

1.6. Hydrogeological Conditions

As for hydrogeological regions, the assessed area is part of the Q 050 ground water region "Trnavská pahorkatina Quaternary".

1.7. Pedological Conditions

Almost the entire area of Jaslovské Bohunice NF is situated on originally muck brown earth which changed to anthrosol at the place of construction.

1.8. Biotic Conditions

1.8.1. Flora

The assessed area is part of the cultural landscape with a prevalence of agricultural production. The level of biodiversity of the agricultural landscape is very low.

1.8.2. Fauna

The character of animal communities in the surroundings of Jaslovské Bohunice NF is typical for agricultural and cultural inhabited landscapes with a prevalence of field monoculture types with low diversity of species and low abundance.

1.9. Protected Areas and Protection Zones

The affected area and its surroundings is situated at a territory falling under level 1 of nature and landscape protection pursuant to Act No. 543/2002 Coll. on Nature and Landscape Protection (as amended), i.e. it does not extend to any protected areas and other elements of nature and landscape protection.

The affected area does not extend to protected bird territories and territories of European importance (***NATURA 2000*** sites) either.

2. LANDSCAPE, STABILITY, PROTECTION, SCENERY

2.1. Landscape Structure, Landscape Scenery and Scene

The affected area and its wider surroundings represent an agricultural landscape with its dominant function as arable land.

2.2. Ecological Stability Territorial System

The affected area does not interfere in any elements of the ecological stability territorial system.

3. POPULATION, ITS ACTIVITY, INFRASTRUCTURE, AND CULTURAL AND HISTORIC VALUES OF THE AREA

3.1. Settlements

The municipalities whose cadastral territories are directly affected by the nuclear facilities compound are Jaslovské Bohunice, Veľké Kostoľany, Pečeňady and Ratkovce. Other municipalities whose urbanised areas are located within the area characterised as affected for the purposes of this document (circle with a diameter of 5km with the centre at the RAWPTT site and related buildings of A1 NPP) are Radošovce, Žlkovce, Nižné and Malženice, and Dolné Dubové.

3.2. Industrial Production, Forest Management and Agriculture

INDUSTRY

The industrial production in the affected area focuses primarily on the generation of electric energy from nuclear fuel.

AGRICULTURE

Agricultural production focuses mainly on vegetable production. Animal production is characterised by concentrated beef and pork breeding.

FOREST MANAGEMENT

The affected area is very scarce in forests.

3.3. Transport

The affected districts of Trnava, Hlohovec and Piešťany which comprise the affected area provide all basic types of transport: road, railway and air transport (military airport in Piešťany).

3.4. Technical Infrastructure

The affected area is supplied with drinking water through the public supply network pipelines, with electric energy and natural gas, and has a sewerage system.

4. CURRENT QUALITY OF THE ENVIRONMENT

4.1. Air Pollution

The Jaslovské Bohunice NF compound operates several sources of air pollution, e.g. SE-EBO operates two medium sources of air pollution (diesel aggregate and fuel pumping station); the company JAVYS, a.s. operates one large air pollution source (start-up and stand-by boiler room), some medium sources (a gas boiler room and diesel generators), and also a specific source of air pollution – an incinerator of radioactive waste (it was agreed after the meeting of state administration authorities that the incinerator would not be classified as a source of air pollution pursuant to the relevant legislation), etc.

The sources of ***gaseous radioisotope discharges*** in the air within the affected area are:

- V-2 unit belonging to Slovenské elektrárne (SE EBO (JE V-2),
- V-1 unit belonging to Jadrová a vyraďovacia spoločnosť (JAVYS – JE V1),
- decommissioned A1 unit belonging to Jadrová a vyraďovacia spoločnosť (JAVYS –A1 NPP),
- other nuclear facilities of JAVYS:
    - BRAWTC (Bohunice Radioactive Waste Treatment Centre),
    - ISFSP (Interim storage facility for spent fuel in Jaslovské Bohunice).

Gas emissions are in all cases monitored and then evaluated in relation to guide values (annual limits). Information concerning the SE-EBO facility is (together with an evaluation of liquid radioactive discharges) regularly published on the website: http://www.seas.sk/sk/spolocnost/zivotne-prostredie/vplyv-prevadzok/atomove-elektrarne-bohunice.

The Proponent´s sources of pollution are also monitored and evaluated, and the output data is published on the Proponent´s website.

Table III.4.1/01

Data from measurements and evaluations of radioactive discharges from JAVYS, a.s. sources into the atmosphere – year 2011

Druh výpuste		Obj. 46/A výpusť	% z roč. lim.	Obj. 46/B výpusť	% z roč. lim.	Obj. 808 výpusť	% z roč. lim.	MSVP výpusť	% z roč. lim.	V-1 výpusť	% z roč. lim.	JAVYS
Množstvo vzduchu	[m^3]	1,01E+09	-	3,72E+08	-	4,87E+08	-	5,00E+08	-	4,17E+09	-	6,537E+09
Vzácne plyny	[TBq]	-	-	-	-	-	-	-	-	2,058	0,10	2,058
Jód ^{131}I	[MBq]	-	-	-	-	-	-	-	-	0,423	0,00	0,423
Stroncium $^{89}Sr+^{90}Sr$	[kBq]	53,616	0,27	19,592	0,47	57,248	1,36	27,806	-	22,883	0,02	181,145
Uhlík ^{14}C	[GBq]	-	-	-	-	-	-	-	-	27,228	-	27,228
Trícium ^{3}H	[GBq]	-	-	-	-	-	-	-	-	36,097	-	36,097
aerosóly:	[MBq]											
^{51}Cr		0,124		0,0356		0,089		0,036		0,229		0,513
^{54}Mn		0,025		0,0085		0,022		0,010		0,185		0,250
^{59}Fe		0,037		0,0144		0,021		0,014		0,057		0,144
^{57}Co		0,028		0,0053		0,016		0,008		0,017		0,074
^{58}Co		0,021		0,0082		0,020		0,012		0,025		0,085
^{60}Co		0,025		0,0092		0,024		0,044		1,914		2,016
^{65}Zn		0,044		0,0189		0,028		0,020		0,081		0,191
^{94}Nb		0,004		0,0007		0,002		-		0,029		0,035
^{95}Nb		0,020		0,0095		0,024		0,012		0,005		0,071
^{95}Zr		0,029		0,0117		0,017		0,015		0,044		0,117
^{103}Ru		0,022		0,0081		0,021		0,011		0,026		0,088
^{106}Rh		0,068		0,0131		0,033		0,035		0,085		0,234
^{110m}Ag		0,026		0,0111		0,024		0,014		0,100		0,175
^{124}Sb		0,020		0,0076		0,019		0,010		0,027		0,085
^{125}Sb		0,011		0,0022		0,006		-		0,011		0,030
^{134}Cs		0,024		0,0089		0,023		0,012		0,046		0,113
^{137}Cs		0,788		0,0886		0,147		0,031		0,407		1,461
^{141}Ce		0,023		0,0086		0,013		0,013		0,033		0,091
^{144}Ce		0,083		0,0195		0,053		0,026		0,146		0,327
^{55}Fe										5,987		5,987
suma aerosólov	[MBq]	1,419	0,22	0,2898	0,21	0,602	0,43	0,322		9,456	0,01	12,088
aerosoly alfa:	[kBq]											
^{238}Pu		0,666		0,174		0,567		0,480		0,111		1,998
$^{239+240}Pu$		4,566		0,378		0,462		0,355		1,301		7,063
^{241}Am		5,938		0,746		0,793		0,412		1,086		8,975
suma alfa aerosólov	[kBq]	11,169	0,18	1,298	0,10	1,822	0,14	1,248		2,499	0,01	18,035
suma aerosóly	[MBq]							0,351	0,12			

Poznámky:
Percentá sú vypočítané z nových limitných hodnôt (platné od 20.7. resp. od 21.10.2011.

Notes:
The percentage rates are calculated on the basis of new limit values (in force since 20 July or 21 October 2011).

% z roč.	% of annual limit
Aerosoly	Aerosols
Druh výpuste	Type of discharge
Jód	Iodine
Množstvo vzduchu	Air volume
Suma aerosolov	Total of aerosols
Uhlík	Carbon
Výpusť	Discharge
Vzácne plyny	Nobel gases

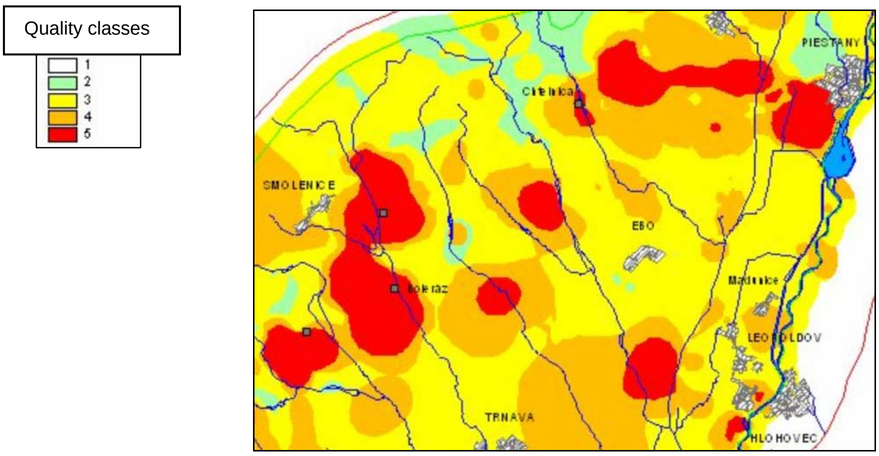
In order to control the impacts of gas discharges under the Jaslovské Bohunice NPP monitoring programme, the activity of aerosols is also evaluated. Samples of aerosols are taken at 24 measuring points. The activity of pollutants is also monitored. The activity of pollutant 137 Cs was below the MDA (minimum detectable activity) at all six measuring points during the entire year 2011.

The overall evaluation and other monitored indicators prove minimum impacts of the SE EBO and JAVYS, a.s. sites on the surroundings.

4.2. Water Contamination

The assessment of ***surface waters quality*** can be based on the results of the regional survey conducted for the assessment of geological factors.
The quality classes shown on the map below are identical with the quality classes of surface waters under STN 75 7221 (Classification of surface waters quality), where class I means highest quality surface water (very clean water) and class V means worst quality water (very heavily contaminated water).

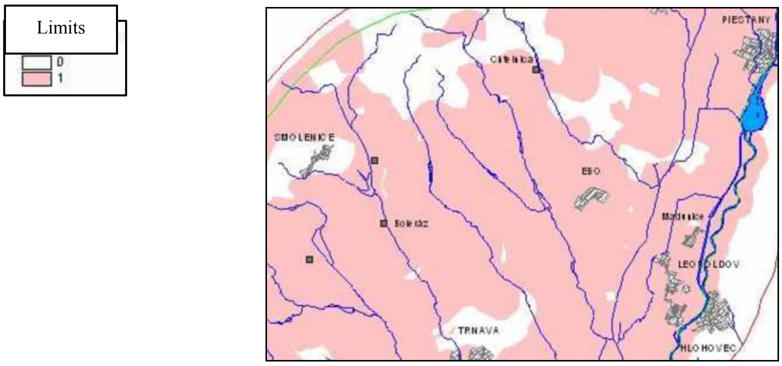
FIGURE. Cut-out of the map of surface waters quality by quality classes



Source: A. Jasovská, 2004 a M. Zlocha, B. Antal, 2003 in J. Schwarz a kol., 2004 (Collection of regional maps of environmental geological factors of the Trnavská pahorkatina region, ENVIGEO, 2004)

The following map of water quality shows the division of ground waters into two categories – ground water suitable for drinking purposes (limit value 0) and ground water not suitable for drinking purposes (limit value 1). The main reason for unsuitability of ground water in the given area for drinking purposes is the contents of nitrogenous substances coming from agricultural production.

FIGURE Cut-out from the map of ground waters quality by suitability for drinking purposes



Source: A. Jasovská, 2004 a M. Zlocha, B. Antal, 2003 in J. Schwarz a kol., 2004 (Collection of regional maps of environmental geological factors of the Trnavská pahorkatina region, ENVIGEO, 2004)

With regard to their use, the waters of the affected area are also burdened with ***liquid discharges from*** SE-EBO and operating units of the company JAVYS, a.s.
As has been mentioned above, the activity of discharges from SE-EBO is regularly monitored, and results of the evaluation are published on the website: http://www.seas.sk/sk/spolocnost/zivotne-prostredie/vplyv-prevadzok/atomove-elektrarne-bohunice.

The burden caused by liquid radioactive discharges and by common pollution from the operating units of the company JAVYS, a.s. is also monitored and evaluated (see table below + for example, Table IV.2.2/02).

Table III.4.2/01

Data from measurements and evaluations of radioactive discharges from JAVYS, a.s. sources into the hydrosphere – year 2011

Druh výpuste	recipient Dudváh				JAVYS
	TSÚ RAO+JE A1	% z ročného limitu	JE V1	% z ročného limitu	
Množstvo vody [m³]	88		0		88
Gamaspektrometrická analýza [MBq]					
^{51}Cr	0,006				
^{54}Mn	0,008				
^{55}Fe	-				
^{59}Fe	0,016				
^{57}Co	0,005				
^{58}Co	0,007				
^{60}Co	0,011				
^{65}Zn	0,025				
^{95}Zr	0,013				
^{94}Nb	0,001				
^{95}Nb	0,008				
^{103}Ru	0,007				
^{106}Rh	0,070				
^{110m}Ag	0,013				
^{124}Sb	0,007				
^{125}Sb	0,004				
^{131}I	0,009				
^{134}Cs	0,008				
^{137}Cs	0,023				
^{141}Ce	0,009				
^{144}Ce	0,040				
Suma [MBq]	0,290				0,290
Sanačné čerpanie [MBq]	0				
Alfaspektrometrická analýza					
^{238}Pu					
$^{239+240}Pu$					
^{241}Am					
Suma [MBq]	0				
^{90}Sr [MBq]	0				
Korózne a štiepne produkty [MBq]	0,290	0,242	0		0,290
Trícium ^{3}H [MBq]	1,740	0,005	0		1,740

Druh výpuste	recipient Váh				JAVYS
	TSÚ RAO+JE A1	% z ročného limitu	JE V1	% z ročného limitu	
Množstvo vody [m³]	195577		9175		204752
Gamaspektrometrická analýza [MBq]					
^{51}Cr	0,695		0,039		0,734
^{54}Mn	0,960		0,124		1,084
^{55}Fe	-		0,929		0,929
^{59}Fe	1,816		0,054		1,870
^{57}Co	0,639		0,043		0,682
^{58}Co	0,861		0,049		0,910
^{60}Co	1,194		0,880		2,074
^{65}Zn	2,619		0,123		2,742
^{95}Zr	1,508		0,034		1,542
^{94}Nb	0,08		0,021		0,101
^{95}Nb	0,893		0,063		0,956
^{103}Ru	0,879		0,027		0,906
^{106}Rh	7,729		0,098		7,827
^{110m}Ag	1,338		6,591		7,929
^{124}Sb	0,829		0,050		0,879
^{125}Sb	0,243		0,037		0,280
^{131}I	1,108		0,045		1,153
^{134}Cs	0,992		0,281		1,273
^{137}Cs	16,626		10,411		27,037
^{141}Ce	1,132		0,032		1,164
^{144}Ce	5,039		0,281		5,320
Suma [MBq]	47,1802		20,214		67,394
Sanačné čerpanie [MBq]	5,224		-		
Alfaspektrometrická analýza					
^{238}Pu	0,036		0,002		0,038
$^{239+240}Pu$	0,037		0,020		0,057
^{241}Am	0,029		0,014		0,043
Suma [MBq]	0,102		0,037		0,138
$^{89}Sr+^{90}Sr$ [MBq]	2,926		2,497		6,423
Korózne a štiepne produkty [MBq]	66,4322	0,46	22,747	0,17	78,179
Trícium ^{3}H [GBq]	348,42	3,46	578,61	28,83	923,04

Poznámky:
Percentá sú vypočítané z nových limitných hodnôt (platné od 20.7. resp. od 21.10.2011).

Notes:
The percentage rates are calculated on the basis of new limit values (in force since 20 July or 21 October 2011).

% z roč. limitu	% of the annual limit
Alfaspektroskopická analýza	Alpha-spectroscopic analysis
Druh výpuste	Type of discharge
Gamaspektroskopická analýza	Gamma-spectroscopic analysis
Korózne stiepne produkty	Corrosive fissiles
Množstvo vody	Water volume
Sanacne cerpanie	Recovery pumping
Výpusť	Discharge

The impacts of radioactive discharges in the form of activity of surface, drinking and ground waters are monitored as part of the radiation control of the Jaslovské Bohunice NF surroundings: on a quarterly basis for drinking waters (10 litres), on a monthly basis for surface waters, and twice a year (in spring and autumn) for ground waters (in drills). The results are evaluated in the individual reports. The overall evaluation and other monitored indicators show minimum impacts of the SE EBO and JAVYS, a.s. sites on the surroundings.

4.3. Soil Contamination

The results of the regional geochemical soil survey (J. Čurlík, P. Ševčík, 2002) imply that the affected area does not show anomalous contents of contaminating substances in soil (the sampling density is approx. 1 sample per 3km^2).

The ***radiation control*** of the Jaslovské Bohunice NF monitors the activity of soil in the surroundings. Soil is taken once per year. What is determined is the volume activity of natural radionuclides (uranium decomposition chain – ^{226}Ra, thorium decomposition chain – ^{232}Th and isotope ^{40}K) and the weight activity of ^{137}Cs or of other artificial radionuclides.

The INSITU gamma spectrometry is performed twice a year in spring and in autumn. The measurement is conducted near the dosimetry stations. The INSITU measurement includes measurement of the dose power rate at the given point and the taking of soil samples.

The monitoring results confirm the fact that the contents of natural and artificial radionuclides in soil are close to the average contents in the entire region, without distinguishable anomalies caused by the Jaslovské Bohunice NF.

4.4. Noise and Vibrations

Besides the nuclear facilities as such, there are no other comparable significant stationary sources of noise in the affected area. Car and railway transport represent a major source of noise and vibrations in the affected area.

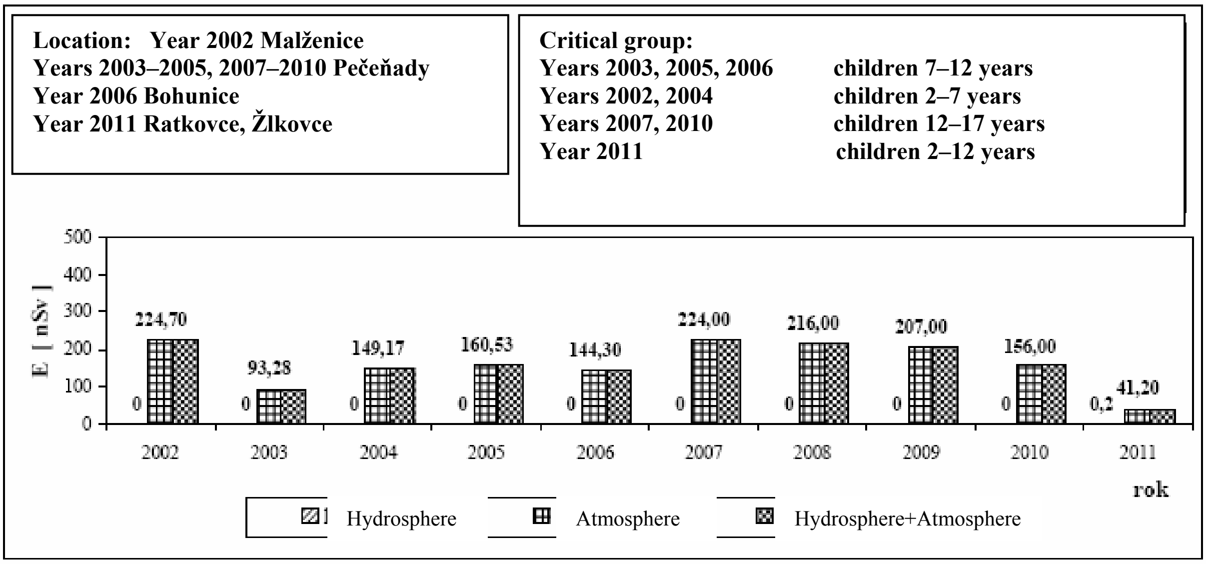
4.5. Sources of Radiation and Other Physical Fields

The measurement of the dose rate in the surroundings of the Jaslovské Bohunice NF area is performed continuously at the 24 stations of the teledosimetric system.

The ambient dose equivalent dose rates are regularly evaluated, and the evaluation results are published in the above-mentioned website.

In order to provide an overall picture of the previous information about the exposition of individual components of the environment to radioisotopes (including food chain) generated by the existence of the Jaslovské Bohunice NF site, the table below shows the radiation burden of the population nearby the SE EBO and JAVYS operation units during the past ten years (source: report *Radiation Protection in JAVYS, a.s. and the Impacts of JAVYS, a.s. Site on the Surroundings, 2011*). The higher dose values compared to the period prior to the year 2007 are due to the use of a new computer programme ESTE AI, which, for the calculation of the dose burden in the surroundings, uses conservative inhalation factors, higher water consumption and a higher speed of breathing in the different groups on the basis of the requirements arising from the Government SR Regulation No. 345/2006 Coll. and Decree of the MoH SR No. 545/2007 Coll.

FIGURE Radiation burden of the population in the surroundings of SE EBO and JAVYS throughout the past ten years



Note: Highest annual effective doses E of a representative person calculated from liquid and gas discharges of radioactive substances from SE EBO and JAVYS sites (year 2011 – only JAVYS)

4.6. Current Health Condition of the Population

The life expectancy upon birth (i.e. the expected number of years that a new-born child lives with unchanged mortality models) was 71.62 years in males and 78.84 years in females in Slovakia in 2010, which is still under the Western-European average in spite of a rising tendency throughout the past years. According to statistical data, the life expectancy in the period 2006–2010 in the affected Hlohovec District is 70.85 years in males and 80.08 years in females; in the affected Piešťany District it is 80.11 years in females and 72.54 years in males; and in the affected Trnava District it is 80.49 years in females and 72.54 years in males, which represents higher life expectancy rates compared to the national average of the SR, with the exception of males in Hlohovec District.

From the point of view of another demographic indicator—abortion rate—where the environmental aspect plays a role in spontaneous abortions, such as the content of pollutants in the air, water and food, two of the three affected districts show higher spontaneous abortion rates than the national average.

Another indicator of people´s health condition can be the number of live-born children with congenital defects; this indicator is, however, influenced by a variety of other factors, such as the expectant mother´s age, her behaviour during pregnancy, etc. In two affected districts (Hlohovec and Trnava), this indicator is far below the national average, and in the case of

Piešťany District it is close to the national average. There was no dead-born child with a congenital defect in the affected districts in 2010. In connection with congenital defects, no artificial abortions were performed.

As for the causes of mortality in the affected area in the given year, circulation system diseases and cancer dominate both in the affected districts and at the national level in the given year.

IV. BASIC INFORMATION ABOUT THE EXPECTED ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTIVITY, INCLUDING HEALTH, AND ABOUT POSSIBLE MITIGATION MEASURES

1. INPUT REQUIREMENTS

1.1. Occupation of Land

The technology and operating units for RAW processing and treatment are located in the existing buildings of the decommissioned A1 NPP site, or in its vacant premises. Hence, the proposed activity does not require new occupation of land.

1.2. Water Consumption

During the operation of RAW processing and treatment technology at the Jaslovské Bohunice location, the ***drinking water*** consumption depends, for example, on the drinking and hygienic needs of the staff. The drinking water supply for employees within the Proponent´s company site is ensured by means of a drinking water distribution network owned by the Proponent. In 2011, the total drinking water consumption at Jaslovské Bohunice location was 176,550m^3.

Water consumption is also tied to RAW processing and treatment works, such as:

- ✓ treatment of chemical additives, for example, during bituminisation, flushing (decontamination) of equipment, laboratory needs, etc. (demineralised water);
- ✓ cooling of the air-conditioning system, condenser, some operation tanks, flue gases from the incinerator, etc. (cooling water);
- ✓ heating of tanks with concentrates, bitumen, etc. (hot water or steam).

Cooling waters and demineralised water are supplied by V1 NPP; hot water is supplied by the exchanger station (ES) of the start-up and stand-by boiler room (building 441); and steam is supplied by V2 NPP through the exchanger station of 441 V1 NPP.

As for water consumption, the available data shows (the level of data detail is limited by the scope of monitored operating indicators) that the consumption of cooling technological water at the location of the decommissioned A1 NPP in the documented year 2011 reached 24,742m^3 (481m3 by BRAWTC, 15,799m^3 by BL+DBL, and 8,462m^3 by building 41 WWTP). Provided that the full processing capacity of the technology is used, a qualified estimation suggests a cooling technological water consumption of approx. 27,500m^3/year.

The consumption of demineralised water at the A1 NPP location in the given year reached 5,887m^3, of which 50m^3 was consumed by BRAWPC, 13m^3 by BL+DBL, 12m^3 by building 41 WWTP, 40m^3 by HDL, 5,730m^3 by auxiliary circuits, 12m^3 by SFF, and 30m^3 by TTC. If the full processing capacity of the technology is used, a qualified estimation suggests a demineralised water consumption of approx. 6,500m^3/year.

Heat consumption through steam or hot water supplies is described in Chapter IV.1.4.

1.3. Sources of Raw Materials

At the time of operation, the main inputs of the facility activities are RAW currently produced by the NPP operation at the Jaslovské Bohunice location, solid RAW produced at the Mochovce location, as well as earlier RAW from these activities, RAW from stage II of A1 NPP decommissioning and V1 NPP decommissioning, and institutional RAW.

The available information about the processing capacities of the given technology and RAW amounts processed in 2011 is provided in the table below.

Table IV.1.3/01

Processing capacities of the technology and RAW volumes processed in 2011

Item	Operating unit/Technology	Annual processing capacity (designed)	Year 2011
1.	Concentration	750m^3	454m^3
2	Cementation	1,100m^3	545m^3
3.	Sorting	50t	5t
4.	Incineration	240t	85t
5.	HP pressing	420t	254t
6.	PS 44 and PS100	270m^3	270m^3
7.	Discontinuous BL (DBL)	48m^3	0m^3
8.	Waste water treatment plant (WWTP)	3,000m^3	1,586m^3
9.	Metallic RAW processing*	500t	280t
10.	AC filter processing	15t	3t

11.	Large-capacity decontamination line (LDL)*	500t	200t
12.	Sludge fixation facility (SFF)	150 barrels/year per 1 shift	263 barrels/3 shifts
13.	Contaminated concrete treatment facility (CCTF)	270t	150t
14.	Contaminated soil sorting facility (CSSF)	1,800t	450t
15.	Sorting facility in building 44/20	approx. 5 barrels a day**	0t
16.	Facility for the decontamination of gas-holders DEZAPLYN	5 pcs	new equipment
17.	Concrete blocks grinding and sorting facility	-**	new equipment
18.	Vitrification facility (VICHR)	$3m^3$	$0m^3$
19.	Fuel treatment facility (FTF)	30 pcs	9 pcs PDS
20.	New draining bed (NDB)	-**	$960dm^3$
21.	Treatment of cases from the long-term storage facility (TCLSF)	15 pcs	14 pcsPDS
22.	Decontamination node (DN) in O-P corridor	-**	***
23.	Dowtherm cleaning equipment	$400dm^3$	$385dm^3$
24.	SUZA DS – sludge processing equipment	-**	2,800kg
25.	Hot chamber (HC)	-**	***
26.	Facility for the fragmentation of large-size metallic RAW	-**	new equipment
27.	Fragmetnation equipment FRAGIS I	-**	- Note: this equipment serves for the warehousing of used devices and tools
28.	Decontamination equipment FRAGIS II	-**	new equipment

Explanatory notes: *under a separate assessment process, ** not strictly determined, *** observes the A1 NP decommissioning process.

In order to process them, the used technology/oeprating units require inputs from other auxiliary materials and raw materials, such as packages (barrels, FCCs), preparation units for water treatment, materials for the preparation of filler substances e.g. cement), etc.

1.4. Energy Sources

The proposed activity operation requires ***heat energy.***

As for equipment consuming natural gas for energy purposes, the boiler LOOS operated by the Proponent has a relation to the given technology. The purpose of its use is steam generation for building 809 (specifically, bituminisation lines). Its ***natural gas*** consumption in the documented year 2011 was 1,593m^3.

The other heating and heat demands concerning the technology are satisfied through SE-EBO.

In general, the available data (the level of data detail is limited by the scope of monitored operating indicators) shows that the consumption of ***heat for heating purposes and hot service water*** supplied from V2 NPP to the decommissioned A1 NPP in 2011 was 15,954,450kWh, of which 2,560,989kWh was supplied to BRATPC, 1,121,169kWh to BL+DBL, and 802,935kWh to building 41 WWTP. If the full processing capacity of the technology is used, a qualified estimation suggests a heat consumption for heating and hot service water of approx.17,550,000kWh/year.

The consumption of ***heat for technology*** supplied from V2 NPP to the location of the decommissioned A1 NPP was 9,212,851kWh in 2011, of which 1,486,956kWh was supplied to BRAWTC, 3,614,751kWh to BL+DBL, 3,226,137kWh to building 41 WWTP, and 885,007kWh to LDL. If the full processing capacity of the technology is used, a qualified estimation implies heat consumption for the technology of approx.10,700,000kWh/year.

Following the completion of the BRAWTC incinerator refurbishment, natural gas consumption will also be tied to the operation of this facility (the refurbishment will include change of fuel). According to the refurbishment project documentation, the total gas demand of the installed gas burners is 107m^3/h. In 2011, the number of operating hours of the incinerator before refurbishment was 4,851h/year. With this amount of working hours the annual natural gas consumption would be approx. 519,000m^3/year.

Electric energy supply is required for the operation of the major part of installed processing facilities, including safeguarding and support activities, such as control systems, air-conditioning (including local heating to prevent condensation), lighting, monitoring, decontamination, etc.

Electric energy is supplied through independent 6kV power mains from A1 NPP´s own distribution point.

Electric energy consumption at the A1 NPP location was 8,229,735kWh in 2011. In the case of maximum use of the technology´s processing capacity, a qualified estimate suggests an increase by approx. 850,000kWh of this consumption.

1.5. Transport and Other Infrastructure Requirements

The frequency of freight transport (road and rail) related to the operation of RAW processing and treatment technology at the Jaslovské Bohunice location is provided in the table below.

Table IV.1.5/01

Transport requirements (freight transport) in 2011

Transport	*Trucks*	*Rail wagons*
Delivery of auxiliary substances and raw materials, such as cement, lime, bitumen, chemicals, etc.	68 (supplier)	0
Delivery of packages: Barrels FCCs	 1 (supplier) 137	 17 wagons 0
Disposal of inactive waste	121 trucks	5 wagons (sale of 5 transformers)
Delivery of RAW from the nuclear facility Mochovce to Jaslovské Bohunice	1 FP LRAW operation 11 SE-EMO operation	0
Disposal of RAW from Jaslovské Bohunice to FP LRAW	1	0
Disposal of seasoned FCCs to NRAWR Mochovce	127	0

Note: RAW transport will require one truck for 40 barrels or 2 FCCs; four wagons are available for rail transport with 3 FCCs per wagon.

If the maximum processing capacity of the technology is used, a qualified estimate suggests an increase in the total transport requirements by approx. 120 trucks per year for the transport of raw materials, packages and waste, and by 80 transports of FCCs to the NRAWR.

With approx. 250 working days per year and with the transport requirements described above, the average frequency of freight transport in 2011 was is 1–2 trucks. In the case of a conservative approach (i.e. planning of maximum transport requirements), the frequency would increase to approx. 2-3 trucks.

Passenger transport relates to the transport of Proponent´s employees and visitors, and the estimated frequency during working days is approx. 400 cars, yet it is not possible to determine the precise share of cars related to the operation of the given technology.

1.6. Labour Force Requirements

The ***operation*** of the facilities and worksites, including safeguarding works, such as monitoring, maintenance, etc., is ensured by approx. 270 employees. Some of them work within departments which perform works for the entire technology compound. Other employees execute their work in direct relation to the individual RAW processing and treatment worksites. Some worksites are, however, operated directly by contractors, such as CCPF and CSPF, and some safeguarding activities are also ensured on a contracting basis.

2. OUTPUT DATA

2.1. Air Pollution Sources

2.1.1. Spot Sources

The ***operation*** of RAW processing and treatment technology in Jaslovské Bohunice is not connected to any air pollution source under the legislation on air protection in spite of the fact that BRAWTC includes a facility for RAW incineration (consensus between the competent state administration authorities). The operation of the LOOS boiler (medium sources of air pollution, fuel ZP) indirectly relates to the given technology, as it generates steam for the bituminisation lines (building 809).

Hence, the technology set is only a source of waste air extracted from the operating premises of the different worksites and conducted away through the air-conditioning system to the outlets (vent chimneys), as well as flue gases from the RAW incinerator which are also conducted away, after being treated, to one of the vent chimneys. The extracted air is contaminated with radionuclides and with pollutants (for example, VOCs can be released during bitumen handling after heating, or the environment can get dustier during cementation and handling of dusty materials). Besides radionuclides, flue gases from the RAW incinerator also contain common pollutants from waste incineration which are monitored within the following scope: solid pollutants (SP), NO_x, SO_2, HCl, HF, TOC, CO, heavy metals, and PCDD/F type substances.

Air discharges and volumes are provided in the table below.

Table IV.2.1/01

Discharges into atmosphere

Discharge	Air-conditioning facilities of buildings no.	Released air volume – designed capacity	Released air volume in 2011
Chimney, building 46, Part A	28, 30, 32, 34	total $3.8x10^5 m^3/h$	total $1.01x10^9 m^3$
Chimney, building 46, Part A B	809, 41	total $1.5x10^5 m^3/h$	Buildings 809 and 41: $3.72x10^8 m^3$
Chimney of building 808	808, 44/10, 44/20	total $98,600 m^3/h$	total $4.88x10^8 m^3$

Note: Building 46 is an iron-concrete monolithic chimney 100m high with vent diameter of 4.25m, and divided by a vertical wall.
The chimney of building 808 is made of steel with circle cross-section of Φ2,150 mm and with the upper edge of the chimney at +40.00m above ground.

All extracted air, in order to reduce its activity before its entry into vent chimneys, is filtered using optimally designed filtration equipment, for example, the air-conditioning equipment of building 809—special air filters FAH and FAV with an assumed 99.95% filtration effectiveness for aerosols of 0.3 micrometres (two-level filtration); equipment for AC filters processing—KEMPER 5000 regeneration equipment + demister pocket filter FOA for air from operating units; compact pre-filter VARI PAK, and highly-effective HEPA filter, etc.

The activity of discharged air is monitored within the following scope:

i. Strontium ^{90}Sr
ii. Radionuclides ^{54}Mn, ^{57}Co, ^{60}Co, ^{65}Zn, ^{94}Nb, ^{110m}Ag, ^{125}Sb, ^{134}Cs, ^{137}Cs, ^{144}Ce
iii. Radionuclides emitting alpha radiation 238Pu, 239+240Pu, 241Am
iv. Tritium.

A monitoring device is installed specifically for the incinerator facility pursuant to the air protection legislation. The device continuously monitors SPs, NO_x, SO_2, HCl, HF, TOC, CO, O_2, humidity, pressure, temperature, and flow volume of flue gases, discontinuous heavy metals, and substances of type PCDD/F.

The PHA SR defined the following guide values (limits) for air discharges into the atmosphere by the A1 FPP and RAWPTT (Decision No. OOZPŽ/7119/2011 of 21 October 2011):

Table IV.2.1/02

Limits for discharges into atmosphere

Annual limit	***Vent chimney***		
	Building 46 A	***Building 46 B***	***Building 808***
Mixture of long-lasting nuclides under point b)	658MBq	141MBq	141MBq
^{90}Sr	19.6MBq	4.2MBq	4.2MBq
Mixture of alpha nuclides under point c)	6.16MBq	1.32MBq	1.32MBq

The limits for common pollutants and the conditions for the observance of these limits (with regard to the practice of competent authorities according to which the incinerator of radioactive waste is not a source of air pollution pursuant to the air protection legislation) are approved by the Nuclear Regulatory Authority of the SR, while the scope of monitored pollutant parameters is based on the legal requirements for air protection. The current limits (prior to refurbishment) were approved by NRA SR Decision No. 495/2010 of 20 December 2010.

Table IV.2.1/03

Limits for common pollutants from waste incineration

Pollutant	***Emission limit (mg/m^3)***
Solid pollutants	30
TOC	20
HCl	30
HF	2
SO_2	300
NO_x	500
CO	100
Hg, Tl, Cd total	0.2
As, Ni, Cr, Co total	1
Pb, Cu, Mn total	5

Note: limits based on nominal operation of the incinerator, for dry gas under standard conditions of 101.32kPa and 0℃, and with oxygen contents in flue gases of 11% vol.

The following discharges were measured in 2011.

Table IV.2.1/04

Discharges into the atmosphere – RAWPTT + A1 NPP, year 2011

	Building 46 A		***Building 46***		***Building 808***	
	Discharge	***% of annual limit***	***Discharge***	***% of annual limit***	***Discharge***	***% of annual limit***
Air volume [m^3]	1.01E+09		3.72E+08		4.87E+08	
Strontium $^{89}Sr+^{90}Sr$ [kBq]	***53.616***	0.27	***19.592***	0.47	***57.248***	1.36
Tritium ^3H [GBq]	-	-	-	-	-	-
Aerosols: [MBq]						
^{51}Cr	0.124		0.0356		0.089	
^{54}Mn	0.025		0.0085		0.022	
^{59}Fe	0.037		0.0144		0.021	
^{57}Co	0.028		0.0053		0.016	
^{58}Co	0.021		0.0082		0.020	
^{60}Co	0.025		0.0092		0.024	
^{65}Zn	0.044		0.0189		0.028	
^{94}Nb	0.004		0.0007		0.002	
^{95}Nb	0.020		0.0095		0.024	
^{95}Zr	0.029		0.0117		0.017	
^{103}Ru	0.022		0.0081		0.021	
^{106}Rh	0.068		0.0131		0.033	
^{110}mAg	0.026		0.0111		0.024	
^{124}Sb	0.020		0.0076		0.019	
^{125}Sb	0.011		0.0022		0.006	
^{134}Cs	0.024		0.0089		0.023	
^{137}Cs	0.788		0.0886		0.147	
^{141}Ce	0.023		0.0086		0.013	
^{144}Ce	0.083		0.0195		0.053	
^{55}Fe	-		-		-	
Total aerosols [MBq]	***1.419***	0.22	***0.2898***	0.21	***0.602***	0.43
Aerosols alpha: [kBq]						
^{238}Pu	0.666		0.174		0.567	
$^{239+240}Pu$	4.566		0.378		0.462	
^{241}Am	5.938		0.746		0.793	
Total alpha aerosols [kBq]	***11.169***	0.18	***1.298***	0.10	***1.822***	0.14

The emissions of common pollutants discharged from the RAW incinerator in 2011 with 4,851 working hours are provided in the table below.

Table IV.2.1/05

Amount of common pollutants from the BRAWTC in 2011

Pollutant	*Year 2011 (t)*
HCl	0.00054
HF	0.000113
Hg+Tl+Cd	0.000034
As+Ni+Cr+Co	0.00033
Pb+Cu+Mn	0.000205
SO_2	0.00405
NO_X	0.67666
CO	0.05793
TZL	0.00561
TOC	0.01247

2.1.2. Area Sources

All air from controlled zones is collected and discharged in an organised manner. All potential area (or fugitive) sources of contamination thus become spot sources of air contamination, equipped with cleaning and monitoring devices in line with the information provided above.

2.1.3. Line Sources and Mobile Sources

Transport is a source of common pollutants from fuel combustion in motors (mainly NO_x, SPs, VOCs). In 2011, the average frequency of freight transport (with approx. 250 working days) was 1–2 trucks/day; under a conservative approach (use of the entire processing capacity of the technology set), the frequency would increase to 2–3 trucks/day, i.e. a maximum of six drive-throughs per day (without using the two-way transport capacity of the motor vehicles used).

2.2. Waste Waters

In the ***operation*** premises of the A1 NPP decommissioning technology and RAWPTT, the Proponent has a separated sewer network.

The rain water sewer system drains waters from the roofs of buildings, roads and reinforced areas within the company site. After dosimetric control, the rain water is drained through the open Manivier channel beyond the Municipality of Žlkovice to the Dudváh river at river kilometre 10.1.

Sewage waters from JAVYS buildings are drained through the sewer system to the waste waters mechanic and biological treatment plant of V1 NPP (BIOCLAR), which is currently managed by JAVYS. Treated waste waters are drained to the SOCOMAN pipe collector.

Industrial waters which can be contaminated with oil substances are conducted to the central gravity de-oiling equipment; after cleaning the waters are drained for treatment by clarification with additive cooling water at SE, a.s. – EBO V2.

The technological (special) sewer system is connected to the bulk tanks of the active waters treatment buildings within the adjacent area (building 41 for RAWPTT and A1 NPP); after treatment and control, the waste waters are drained together with sink waters, in an organised way, through the SOCOMAN sewer collector to the Váh river (river kilometre 101.8).
Waste waters from the recovery pumping of ground waters in A1 NPP are also drained to the Váh river.

Active waste waters from RAWPTT and A1 NPP decommissioning are, for example:

- ✓ used decontamination solutions,
- ✓ flushing waters,
- ✓ special sewer draining *(contaminated waste waters from floors of the operating units–rooms, condensate draining from air conduits, coolers and filters of vent systems, condensate draining from chimneys, showers, wash basins and laboratory washing tables),*
- ✓ emergency discharge of distillates from the evaporator,
- ✓ emergency discharge of washing water (flue gas washer),
- ✓ waters collected in emergency bowls,
- ✓ emergency draining of tanks in the different workstations
- ✓ pumping of leaks,
- ✓ etc.

Only active waters discharged from buildings 809 and 41 can be treated in the SOCOMAN sewer system (only exceptionally from building 808).

In 2011, the following volumes of waste waters were discharged from all of Proponent´s facilities at Jaslovské Bohunice:

Váh	961,117m^3
Dudváh	315,360m^3

Of these waters, the volume of technological waste waters from the RAWPTT (i.e. buildings 809 and 41) discharged through the SOCOMAN sewer system to the Váh River was 5,932m^3 (see table above). In case the full processing capacity of the technology is used, a qualified estimate suggests a production of approx. 10,500m^3/year of waste waters.

Also waters from recovery pumping of ground waters from drill N-3 at A1 NPP are drained to the SOCOMAN system, and their volume was 189.645m^3 in 2011. In connection with the A1 NPP decommissioning, also very low activity surface (rain) waters are drained to the Dudváh recipient under the programme PRG-82/5110/A1/2009 "Programme for waste removal, sorting and treatment from basin 38/3 in building 38, and their volume reached 66m^3 in 2011.

The characteristic features of these waters and their comparison with the limits defined in the discharge permit issued by the Regional Environmental Office Trnava are provided in the following tables.

Table IV.2.2/01
Average concentration of chemical pollutants discharged to the recipient VÁH, year 2011

Chemical indicators of pollution (mg/l)	**Average concentration of discharged pollutants (mg/l)**	**Maximum allowed concentration (Decision of REO - 1/2006/00273/Fr) (mg/l)**
Acidity, alkalinity – pH	7.819	9.00
Biochem. oxygen consumption - BOC_5	4.558	8.00
Chemical oxygen consumption – COC_{Cr}	11.458	30.00
Insoluble substances – IS	14.167	20.00
Soluble substances – SS	376.333	1 000.00
Ammonia – $N\text{-}NH_4^+$	1.387	4.00
Nitrates – NO_3^-	17.886	50.00
Sulphates – SO_4^{2-}	31.504	150.00
Chlorides – Cl^-	20.478	100.00
Non-polar extracted substances – NES	0.035	0.35
Total phosphates – $P_{total.}$	0.456	2.00
Iron – Fe	0.161	2.00
Hydrazine hydrate - N_2H_4	0.000	N/A
Detergents – PAL	0.051	0.50

Table IV.2.2/02

Average concentration of chemical pollutants discharged to the recipient DUDVÁH, year 2011

Chemical indicators of pollution (mg/l)	Average concentration of discharged pollutants (mg/l)	Maximum allowed concentration (decision of REO - 1/2006/00273/Fr) (mg/l)
Acidity, alkalinity – pH	8.445	9.00
Chemical oxygen consumption – COC_{Cr}	13.917	30.00
Insoluble substances – IS	16.667	40.00
Soluble substances – SS	368.833	1,000.00
Sulphates – SO_4^{2-}	78.550	150.00
Chlorides – Cl^-	21.142	100.00
Non-polar extracted substances – NES	0.033	0.35
Total phosphates – $P_{total.}$	0.292	2.00
Iron – Fe	0.366	2.00
Hydrazine hydrate – N_2H_4	0.020	2.00

In order to monitor and evaluate the dose burden, the Proponent is obliged to monitor the following indicators in the case of discharges into hydrosphere under PHA SR Decision No. OOZPŽ/7119/2011 of 21 October 2011:

a) radionuclides ^{3}H, ^{54}Mn, ^{57}Co, ^{60}Co, ^{65}Co, ^{65}Zn, ^{94}Nb, ^{110m}Ag, ^{125}Sb, ^{134}Cs, ^{137}Cs, ^{144}Ce
b) strontium ^{90}Sr
c) radionuclides emitting alpha radiation ^{238}Pu, $^{239+240}Pu$, ^{241}Am

The PHA SR decision sets the following guide values (limits) for:

Váh river

a) tritium
annually 1.0×10^{13} Bq, quarterly 2.5×10^{12} Bq
b) other fissile and corrosive products
annually 1.2×10^{10} Bq, quarterly 3.0×10^{9} Bq

Dudváh river

a) tritium
annually 3.7×10^{10} Bq, quarterly 9.25×10^{9} Bq
b) other fissile and corrosive products
annually 1.2×10^{8} Bq, quarterly 3.0×10^{7} Bq

The discharges in 2011 and their activity are shown in the table below.

Table IV.2.2/03

Discharges into hydrosphere, RAWPTT + A1 NPP, year 2011

Type of discharge	*Váh Recipient*		*Recipient Dudváh*	
	Discharge	*% of annual limit*	*Discharge*	*% of annual limit*
Water volume (m^3)	195,577		66	
Gamma spectrum analysis (MBq)				
^{51}Cr	0.695		0.006	
^{54}Mn	0.960		0.008	
^{55}Fe	-		-	
^{59}Fe	1.816		0.016	
^{57}Co	0.639		0.005	
^{58}Co	0.861		0.007	
^{60}Co	1.194		0.011	
^{65}Zn	2.619		0.025	
^{95}Zr	1.508		0.013	
^{94}Nb	0.08		0.001	
^{95}Nb	0.893		0.008	
^{103}Ru	0.879		0.007	
^{106}Rh	7.729		0.070	
^{110m}Ag	1.338		0.013	
^{124}Sb	0.829		0.007	
^{125}Sb	0.243		0.004	
^{131}I	1.108		0.009	
^{134}Cs	0.992		0.008	
^{137}Cs	16.626		0.023	
^{141}Ce	1.132		0.009	
^{144}Ce	5.039		0.040	
Total (MBq)	**47.1802**		**0.290**	
Recovery pumping (MBq)	5.224		0	
Alpha spectrum analysis				
^{238}Pu	0.036			
$^{239+240}Pu$	0.037			
^{241}Am	0.029			
Total (MBq)	**0.102**		**0**	
^{89}Sr+ ^{90}Sr (MBq)	**2.926**		**0**	
Corrosive and fissile products (MBq)	**55.4322**	0.46	**0.290**	0.242
Tritium ^3H (GBq)	**346.42**	3.46	**1.740**	0.005

2.3. Waste

The RAWPTT ***operation*** and the A1 NPP decommissioning is, in reasonable amounts, a source of ***common*** (inactive) operation ***waste,*** such as mixed municipal waste (200301, O), various packing materials (e.g. mixed packs 150106, N; plastic packs PET 150102, N; paper and card-boards 150101, N; packs containing hazardous substances, 150110, N), waste from administration works (e.g. waste cartridge 80317, N), waste from maintenance of equipment and premises (e.g. absorbents, filtering materials, cloths containing hazardous substances, 150202, N), etc. The approximate production of such waste in 2011 was 735,149.8kg (it is not always possible to determine the precise share of technology in the total waste amount produced by the Proponent).

In case the full processing capacity of the technology is used, a qualified estimate suggests a generation of inactive waste of approx. 965.5t/year.

Specific waste produced by the proposed activity is ***radioactive waste,*** or waste materials contaminated with radioactive substances. This waste is directly related to the performed activities, such as protective tools, samples of cement products, air-conditioning filters, saturated ion exchangers and other filtration materials, e.g. active carbon, etc.

During A1 NPP decommissioning and RAWPTT operation, RAW is also produced by various safeguarding and support activities, such as:

- ✓ decontamination works,
- ✓ repairs and maintenance of equipment which get into contact with RA substances,
- ✓ operation of the general air-conditioning system (filters),
- ✓ etc.

These materials are treated as radioactive waste at the respective RAWPTT operating units, depending on their properties.

2.4. Noise and Vibrations

The sources of noise from RAWPTT ***operation*** and JE A1 decommissioning are diverse technological equipment, such as pumps, mixers, defragmentation equipment, air-conditioning, etc. All these pieces of equipment are installed in the internal, closed premises of the building. With regard to the external area, the relevant source of noise is the air-conditioning outlet to the vent chimney.

In connection with the external area, the relevant source of noise is also freight transport within and outside the site with irregular frequency, operating exclusively during day hours on working days. In the case of transport outside the site, it represents, under a conservative estimate, approx. 2-3 trucks/day. As for transport within the site, depending on the extent of utilisation of the technology, it represents approx. 460 transports (i.e. 1–2 transports per day).

The generation of vibrations of appropriate intensity is also related to some technological equipment (e.g. sliding devices for FCCs, etc. with occurrence within its immediate vicinity), and to traffic in the facility surroundings (using freight cars with a semi-trailer).

2.5. Radiation and Other Physical Fields

RAWPTT and the A1 NPP decommissioning technology serve for the processing and treatment of RAW that contains various radionuclides with various activities. As a result of these activities, the technology is the source of waste air and waste waters containing RAS released to the environment (for more details see Chapters IV.2.1. and IV.2.2.). Materials from the decommissioning are also released to the environment, and their activity allows such release (e.g. soils, concrete, metallic waste, etc.).

The A1 NPP premises and surroundings, including RAWPTT, are under the impact of ionizing radiation.

For the RAWPTT facility and A1 NPP decommissioning (including interim storage facility for spent fuels), the PHA SR stipulated, by Decision No. OOZPŽ/7119/2011 of 21 October 2011, the requirement to ensure that “the effective dose caused by RAS released into the air and surface water for a representative person of the population” does not exceed the basic limit value of 12µSv/year (i.e. 12×10^{-6}Sv/year).

For the year 2011, the ESTE programme, version 3.30 (with updated demographic and agricultural data as of October 2011) identified for all Proponent´s facilities within the location, on the basis of actual meteorological measurements and actual discharges, the uninhabited sector 1 north from the Proponent´s site as the sector with highest calculated impacts, where the age category of 2-12 years can be considered as the potential critical group. The calculated total effective dose and the committed dose for all considered organs would be 7.01E-08 Sv. Sector 76 (Ratkovce, Žlkovce) has been identified as the inhabited sector with the maximum total effective dose, where the age category of 2–12 years has been identified as a critical group. The calculated total effective dose in this category per representative person is 4.14E-08 Sv. These values are several orders of magnitude lower than the basic limit value for the given part of the Proponent´s facilities within the location.

The respective activity does not represent a relevant source of any other radiation or physical field.

2.6. Odour and Other Outputs

The A1 NPP decommissioning technology and RAWPTT do not represent a relevant source of pollutant discharges into the municipal environment which would change the odour conditions in the surroundings.

Also, the technology does not represent a source of heat emissions into the external environment exceeding common values.

2.7. Additional Data

The respective activity, as assessed, has already existed in the affected location, and its operation and the planned changes do not require any landscape interventions.

3. Information about Expected Direct and Indirect Environmental Impacts

3.1. Impacts on the Population

The inhabitants of Jaslovské Bohunice municipality in the cadastral territory of which the A1 FPP facility with the RAW processing and treatment technology is situated are directly affected by the facility operation.

For the purposes of this material, the inhabitants of municipalities situated within an approx. 5km diameter from the centre of the affected part of the Proponent´s site are also considered as affected population. This centre was determined for the purpose of defining the affected area and describing its characteristics based on the Pre-Operation Safety Report for RAWPTT where a common disaster area has been considered for the compound of the Proponent´s facilities which consists of A1 NPP, RAWPTT, interim storage facility for spent fuel (ISFSF) and an integral storage facility (IW) for RAW (pursuant to NRA SR Decree No. 55/2006 Coll. on the Details of Emergency Planning in the Case of Accidents, and NRA SR Decision NO. 97/2006) as an area delimited by the border of the neighbouring site of the V1 NPP, defined by the barrier of the guarded space of this nuclear facility. The first zone (A zone) with a 5km radius has been considered as affected area for the assessment of potential impacts on the natural and anthropogenic components of the environment and population pursuant to Decree of the Ministry of Interior of the SR No. 533/2006 Coll. on the Details of Protection of Inhabitants against the Effects of Hazardous Substances.

The justness of this approach is confirmed by the results of the calculation of the actual effective dose for population (refer to Chapter IV.2.5), according to which, for example, the highest dose for all Proponent´s facilities at the location (7.01E-08 Sv) was calculated for the uninhabited sector north from the Proponent´s site, where the age category of 2–12 years would be the potential critical group, and for the inhabited sector (4.14E-08 Sv) – sector 76 (Ratkovce, Žlkovce) at a 5km distance south-east, where again the age category of 2–12 years is the critical group.

Further to this approach, the inhabitants of nine municipalities are identified as affected:
- ✓ Jaslovské Bohunice, Malženice, Radošovce and Dolné Dubové within Trnava District;
- ✓ Žlkovce and Ratkovce within Hlohovec District;
- ✓ Veľké Kostoľany, Nižná and Pečeňady within Piešťany District.

The urban areas closest to the Proponent´s site are the urban areas of Jaslovské Bohunice and Radošovce municipalities at a distance of approx. 2km.

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Due to the absence of the ***implementation stage,*** no impacts on the population will occur in connection with the proposed activity.

The ***operation*** of RAWPTT and A1 NFF decommissioning technology induce both positive and negative impacts, as well as direct and indirect impacts on the population.

The positive, yet indirect impacts on the population include the possibility of a systemic and comprehensive approach to the treatment of radioactive waste from the decommissioning of the A1 NPP which forms part of the affected area and whose operation ended in 1977 due to an accident, V1 NPP decommissioning, operation of other nuclear facilities in the SR, institutional RAW and ZRAM treatment, and existence of stable jobs within the area.

The potentially major negative impacts of the respective activity on the affected population include contribution to the radiation burden of the area, related traffic load, including noise, and emissions of common pollutants from the RAW incinerator facility.

The outcomes of the evaluation of radiation impacts and discharges from the RAWPTT facility and A1 NPP decommissioning imply that the facility largely respects the set limits, and the effective dose per person (generated by all Proponent´s facilities at the location), while using an almost 60% of the processing potential of the principal parts of technology, is several orders of magnitude lower than the effective dose limit set exclusively for RAWPTT, A1 NPP and ISFSF by the PHA SR (see Chapter IV.2.5).

With regard to traffic load at the location, the conservative approach (i.e. assessment of the maximum frequency of freight transport) implies that the contribution of the activity to the traffic load in the monitored section affected by the traffic connection of the Jaslovské Bohunice NF site would represent 3.7% of freight transport and 0.5% of overall transport in the last year of traffic monitoring year.

As for the radiation burden as a result of RAW transport, it can be concluded that all legislative requirements for the radiation control of inhabitants have been met.

Emissions of common pollutants from waste incineration are monitored within the scope defined by air protection legislation. When considering the worst permitted emission situation, the height of the chimney for the discharge of emissions presumes observation of the basic condition arising from the air protection legislation concerning dispersion—the requirement for minimum chimney height. The specific impacts on the emission situation in the surroundings of the nuclear facility and on the health condition of the population will be detailed on the basis of a complex emission assessment conducted by a qualified professional.

The limited amounts of common operation waste (RAW produced during the given activities are processed directly at RAWPTT in Jaslovské Bohunice), production of common sink waters and rain waters, generation of common pollutants from the gas boiler room, etc. do not represent a source of major impacts on the affected population in terms of their significance and design—e.g. waste treatment pursuant to the current legislation with an emphasis on preferential recovery, operation of air pollution sources (APS) in compliance with the relevant legislation, treatment and discharge of waste waters to the recipient in compliance with the set conditions—and distance from the closest built-up area (for example, in relation to APS).

Due to the distance and location of the closest non-industrial urban area, it is irrelevant to consider major impacts on the population produced by noise emissions from installed technological equipment.

Indirect, yet non-quantifiable negative impacts on the population include feelings of psychical discomfort in some individuals arising from their fears from the presence of such facility in the vicinity of their domicile.

3.2. Impacts on the Geological Environment, Minerals, Geodynamic Phenomena and Geomorphological Conditions

Direct impacts on the ***geological environment*** or indirect impacts in the form of contamination are irrelevant for common operation due to the nature of the activity. The potential risk of contamination as a result of non-standard operating conditions (e.g. leakage of liquid radioactive materials due to leaking equipment or pipelines, accidents during the filling of packages /barrels, FCCs/ etc.) can be prevented by emergency measures for all operating premises (sealed joints between floors and walls, water-proof floors and walls up to a reasonable height, sloped areas conducting to the active sewer system, storage of hazardous substances in accordance with Decree of the Ministry of Environment No. 100/2005 Coll., etc.).

The risk of contamination of the geological environment in relation to transport is prevented by observation of the legislative requirements for radiation control and transport requirements in accordance with ADR.
The risk of certain contamination of the soil layer by leakage of hazardous substances from vehicles (e.g. oil, gasoline), removable by common remediation works, appears to be the most realistic risk.
The ***mineral deposits*** are not affected by the activity.
The respective area is not located within a territory with active exogenous geodynamic phenomena (landslides, increased water or wind erosion, etc.), and the respective activity, given its nature, does not induce such phenomena at the affected location. The design of buildings of the A1 NPP site with the respective technology takes into consideration the results of the evaluation of the ***seismic risks*** at the affected location. A later review of the seismic threat to the location did not induce the need to ensure the buildings against seismic activities.

Given its location and nature, the proposed activity does not have any impacts on the local ***geomorphological conditions.***

3.3. Impacts on the Climate Conditions

The assessed activity includes an incineration process (incineration of pollutants— LOOS boiler and RAW) which constitutes a source of carbon dioxide as greenhouse gas. The significance of these sources is proportional to a small share of CO_2 emissions in relation to the overall emissions of greenhouse gases in the SR.

The activity is located in the existing buildings of the large NF compound in Jaslovské Bohunice, which suggests that it does not have an impact on the local micro-climate in connection, for example, with the change of the buildings area, etc.

3.4. Impacts on Air

Due to the absence of the ***implementation stage,*** no impacts on the air will occur.

The RAWPTT and the A1 NPP decommissioning facility primarily produce waste air contaminated with radionuclides. The air is absorbed away from the control zone premises and from the technology as such. In case the full designed potential of the installed air-conditioning systems is used, the volume of waste air discharged to the municipal air, after being purified through three outlets, is approx. 628,600m^3/h (the vent chimney of building 46 is divided by a vertical wall into two outlets (for more details see Chapter IV.2.1). In 2011, with a 60% use of the processing capacity of the principal parts of the technology, approx. $1.869x10^9 m^3$ of such air was released, and its activity met the limits within a big margin (it was several orders of magnitude lower) set by the PHA SR (see Chapter IV.2.1).

In connection with the operation of the RAW incineration plant (part of BRAWTC), also flue gas emissions containing common pollutants are released to the municipal air. Flue gases are conducted to the common chimney for air extracted from the BRAWTC building (40m high). The concentrations of pollutants in flue gases are regularly monitored in compliance with the relevant air protection legislation. On the basis of emission flows corresponding to the worst permitted emission situation, it is assumed that the legislative requirement for the minimum chimney height to ensure dispersion is complied with. The specific impacts on the emission situation in the NF surroundings will be detailed on the basis of the emission assessment by a qualified professional.

RAW processing and treatment by some parts of the technology also produces common pollutants, such as solid pollutants by manipulation with dusty materials during cementation or grinding, VOCs during the handling of heated bitumen, etc. If relevant, such pollutants are removed from the extracted air by a special trapping device. With the current heights of the used vent chimneys, such substances cannot have a relevant impact on the emission situation in the surroundings, provided that their existence is proportional to the scope of performed activities.

The operation of RAWPTT and A1 NPP technology contributes also indirectly to air emissions produced by traffic in the affected area. This contribution of the Proponent, however, does not have a significant impact on the air quality of the affected area (for example, with freight transport outside of the side representing a maximum of 0.5% share in total transport, or traffic within the site representing 1–2 transports per day).

3.5. Impacts on the Water Conditions

Due to the absence of the ***implementation stage,*** no impacts on the water conditions occur.

Performance of the activity is accompanied by the production of common sewage and rain waste waters at amounts corresponding to the area and the number of employees. Before being discharged to the recipient (Dudváh river for rain waters, and Váh river for sewage waters), the waste waters are treated at the mechanical and biological WWTP of V1 NPP or at ORL. The waste waters are discharged to the recipients on the basis of the decision of the Regional Environmental Office Trnava. In 2011, for example, all the limits set for chemical contamination of discharged waters were observed. As for rain waters, their activity is also monitored (see below).

The recipient of technological waste waters is the Váh river. Waste waters are drained to the Váh river after being treated to the required activity level in the (active) waste waters treatment plant (building 41) and monitored.

The limit activity levels for waters drained from RAWPTT and A1 NPP are set by the PHA SR Decision. The results of the monitoring imply that the set limits have been observed within a big margin; in 2011, for example, with a 60% use of the processing capacity of the principal worksites of the given technology set, the activity of radionuclides discharged to the hydrosphere did not reach more than 3.5% of the set limit in all monitored indicators (tritium).

The potential risk of water contamination as a result of non-standard operating conditions is prevented by the design of the operating premises (sealed joints between floors and walls, water-proof floors and walls up to a reasonable height, sloped areas conducting to the active sewer system) and by procedures forming part of the approved emergency plan.

The flow conditions of the recipients suggest that the facility operator complies with all the consents and decisions concerning waste water discharge to the surface recipients Dudváh and Váh.

With regard to the draining conditions of the location, these conditions have been long affected by the existence of the A1 NPP buildings in which the RAW processing and treatment technology is installed.

Note:
Ground waters at the location are influenced in connection with the A1 NPP decommissioning (though not directly by the given technology) by their recovery pumping in line with the relevant decision of the Regional Environmental Office Trnava.

3.6. Impacts on Soil

Due to the absence of the ***implementation stage,*** no impacts on soil will occur in this regard.

The RAWPTT and A1 decommissioning technology is located within the existing buildings of the former A1 NPP site, i.e. the facility´s impact on the occupation of new land is irrelevant.

With regard to the potential impacts induced by contamination, it can be assumed in relation to common pollutants that under normal operating conditions the RAWPTT and 1 NPP decommissioning technology are not a source of common pollutants at amounts representing a risk to soil contamination, change in their chemical composition (acidation), etc.

The impact of RAS discharges on soils, e.g. through rain fall or rain washing, is monitored with the comprehensive system of environmental impact monitoring of nuclear facilities at the Jaslovské Bohunice location; in 2011 (and in long term), this impact, on the basis of the monitoring results, was evaluated as minimum.

The potential risk of contamination as a result of non-standard operating conditions was assessed, for example, under the Pre-Operation Safety Report for RAWPTT, where the area delimited by the border of the neighbouring site of the V1 NPP was considered as the joint disaster area for the compound of the Proponent´s equipment made of the A1 NPP, RAWPTT, interim storage facility for spent fuel (ISFSF) and integral storage facility (IS) for RAW. The various emergency scenarios considered do not assume exceeding of the intervention levels and their guide values for immediate and subsequent measures.

Non-standard situations of common nature, such as transport (e.g. oil or gasoline leakage from motor vehicles into non-reinforced soil) can be solved by common remediation works.

3.7. Impacts on the Fauna, Flora and Their Biotopes

Due to the absence of the ***implementation stage,*** no impacts on the fauna, flora, and their biotopes will occur.

The A1 NPP buildings in which the RAW processing and treatment technology are installed have been part of the NF compound at the Jaslovské Bohunice location for decades. This compound is surrounded by a rural countryside with predominantly agricultural use. The closest areas north from the Proponent´s buildings constitute arable land. This corresponds to the expected occurrence of fauna and flora (synantropic species residing on the edge of human settlements), and poor species diversity.

The closest, less anthropogenically altered biotopes with the probability of bigger species diversity are the biotopes of the areas which form part of small protected zones, such as Dedova jama protected area approx. 6km eastwards from the NF site, etc.

The contribution of the activity to the radiation burden of the area is practically negligible; it can be therefore assumed that this activity does not constitute a source of impact of major significance on the fauna, flora and their biotopes (the Slovak legislation does not define any standards for the exposition of non-anthropoid biotopes).

3.8. Impacts on the Landscape and Its Ecological Stability

Due to the absence of the ***implementation stage,*** no impacts on the landscape and on its ecological stability will occur.

The RAW processing and treatment technology is situated in the A1 NPP buildings within the NF compound in Jaslovské Bohunice, designed as a standard industrial building area.

The impact of the activity on the landscape scenery, its image and structure is practically irrelevant.

From the point of view of ecological stability, the technology location respects the landscape features with its eco-stabilising function, and the impacts on the health condition of these elements that could subsequently reduce their eco-stabilising function can be therefore evaluated as minimum.

3.9. Impacts on the Urban Complex and Land Use

Due to the absence of the ***implementation stage,*** no impacts on the urban complex and land use will occur.

The operation of the RAW processing and treatment technology will not affect the structure of the given urban units.

The traffic connection affects the technical infrastructure of the site and the transport infrastructure of the affected area (the given activity´s share in traffic load by freight cars is max. 3.7%).

The RAWPTT and A1 NPP decommissioning technology have only an indirect potential impact on the agricultural and forest management use of land through the facilities´ contribution to the radiation burden of the area. This contribution is, however, minimum, as confirmed by regular systematic monitoring which also includes monitoring of activities of selected agricultural commodities (e.g. milk, grass, meat, etc.).

The technology has a large impact on the industrial use of the area within the given location, since it represents the possibility for the nuclear facilities to treat the RAW from their operation in a safe and comprehensive manner.

Common waste management in the affected area is influenced just minimumly by the production of inactive waste (approx.. 735t in 2011; RAW is subject to a separate regime), comprising common operating (predominantly recyclable) waste, such as packing materials, waste from maintenance of equipment and premises, municipal waste, etc. from A1 NPP decommissioning.

No other impacts on the urban complex and land use are known.

3.10. Impacts on Cultural and Historic Landmarks

No landmarks with a cultural or historic value as a source of interest to people living in the surroundings or to visitors to the affected region are found within the immediate vicinity of the RAWPTT and A1 NPP decommissioning facilities.

There are several buildings of cultural and historic value within the wider area. These buildings are not affected by the performance of the proposed activity due to its nature and location.

3.11. Impacts on Archaeological Sites

No archaeological sites are found within the immediate vicinity of the given technology (part of the Jaslovské Bohunice NF compound).

3.12. Impacts on Paleontological Sites and Important Geological Localities

No important geological localities or known paleontological sites are found within the immediate vicinity of the proposed activity´s site that could be affected by its operation.

3.13. Impacts on Intangible Cultural Values

As shown above, no cultural values of tangible or intangible nature are found in the given area directly affected by the presence of the given activity. The nature of the proposed activity excludes impacts on local habits and traditions.

3.14. Other Impacts

No other impacts of the proposed activity than those listed above have been identified in the affected area that could influence the comfort and quality of life of the affected municipalities´ inhabitants or of the inhabitants of the more distant surroundings, natural environment or the landscape.

4. HEALTH RISKS ASSESSMENT

As the above-mentioned identification of the activity impacts implies, potentially relevant in relation to public health are the potential risks arising from the given activity´s relation to radiation burden and emissions of pollutants from waste incineration.

With regard to the RAWTPP and A1 NPP decommissioning facility (including interim storage facility for spent fuel), the PHA SR defined, by its Decision No. OOZPŽ/7119/2011 of 21 October 2011, the condition ensuring that the effective dose for a representative person of the population caused by RAS discharged in the air and surface waters does not exceed the basic limit value of 12μSv/year (i.e. 12×10^{-6} Sv/year).

In relation to all Proponent´s facilities within this location, the uninhabited sector 1 north from the Proponent´s site was identified as the sector with highest calculated impacts for the year 2011, where the age category of 2-12 years could be the potential critical group. The calculated total effective dose and the committed dose for all considered organs would be 7.01E-08 Sv. Sector 76 (Ratkovce, Žlkovce) has been identified as the inhabited sector with the maximum total effective dose, where the age category of 2-12 years has been identified as a critical group. The calculated total effective dose and the committed dose for all considered organs in this category per representative person is 4.14E-08 Sv. These values are several orders of magnitude lower than the basic limit value set exclusively for RAWPTT, A1 NPP and TWSF.

This implies that the RAWPTT and A1 NPP decommissioning facilities do not represent, under common operating conditions, any risk to the health condition of the affected population.

The potential risk of contamination as a result of non-standard operating conditions was assessed, for example, under the Pre-Operation Safety Report for RAWPTT, where the area delimited by the border of the neighbouring site of the V1 NPP was considered as the joint disaster area for the compound of the Proponent´s equipment made of the A1 NPP, RAWPTT, temporary storage facility for spent fuel (TSFSF) and integral storage facility (ISF) for RAW. The various emergency scenarios considered do not assume exceeding of the intervention levels and their guide values for immediate and subsequent measures, and all the calculated effective doses were lower than the limit for the irradiation of inhabitants during normal operation.

The population of some affected municipalities can be potentially exposed to radiation burden also in connection with RAW transport. In order to reduce this risk, such transport is performed in accordance with the ADR (European Agreement Concerning the International Carriage of Dangerous Goods by Road) and Decree of the MoH SR No. 545/2007 Coll. laying down the details of requirements for ensuring radiation control in activities causing irradiations and activities important with regard to radiation protection.

As far as the emission of common pollutants from waste incineration is concerned, the preliminary assessment suggests a minimum impact on the emission situation in the surroundings of the given facility which does not represent a potential of health risks for urban areas at a distance of 2m and more.

Hence, there is no expected health risk to the population of the affected municipalities in this regard.

5. INFORMATION ABOUT THE EXPECTED IMPACTS OF THE PROPOSED ACTIVITY ON PROTECTED AREAS

The proposed activity is located at an area falling under the first, lowest degree of territorial protection pursuant to Act No. 543/2002 Coll. on Nature and Landscape Protection as Amended. The implementation of the activity will therefore not affect directly any small or large protected area or their protection zones.

The closest protected areas are:

- Large protected area:
  - ✓ Protected Landscape Area Small Carpathians (west from the NF site at a distance of approx. 10km)
- Small protected areas
  - ✓ Protected area of Dedova jama (approx. 6km east from the NF site)
    - declared for the purpose of protection of the remains of the original flood-plain forest which is a significant refuge for animals, an important landscape element, and a location of unique occurrence of the Summer Snowflake (Leucojum aestivum) and other protected plant species.
  - ✓ Protected site Malé vážky (approx. 7km south-east from the NF site)
    - declared for the protection of aquatic biocenoses important from scientific, research, educational and cultural aspects.
- NATURA 2000 sites
  - ✓ protected bird area SKCHVU054 Špačinsko-nižnianske polia (the closest border is situated at an approx. distance of 1km north from the NF site);
  - ✓ protected bird area SKCHVU014 Malé Karpaty (Small Carpathians) (approx. 11km north from the NF site);
  - ✓ area of European importance SKUEV0267 Biele hory (approx. 21km west from the NF site).

With regard to the above-mentioned distances and the nature of the proposed activity, direct impact on the given subjects of protection is excluded.

As concerns indirect impacts of the given activity which are potentially relevant considering the location and distances of protected areas from the given facilities for RAW processing and treatment from the point of view of the activity´s contribution to radiation burden, it can be concluded, on the basis of regular assessments of the impacts of the NPP in the affected location, that this (cumulative) impact is minimum.

6. ASSESSMENT OF EXPECTED IMPACTS WITH REGARD TO THEIR IMPORTANCE AND DURATION

According to the preliminary assessment, the facility operation, given its design and location, represents a source of low-importance negative impacts on the environment of the affected area. At the same time, the adverse impacts caused by the operation show that such impact features can be mitigated by suitably defined mitigating and protective measures.

On the other hand, the facility operation will have an important positive impact due to its significance for the process of A1 NPP decommissioning and for the complete and safe disposal of RAW generated by other nuclear facilities and in various other spheres of human activities (medicine, research, etc.).

7. EXPECTED IMPACTS BEYOND STATE BORDERS

The chapters above imply that the contribution of RAWPTT and A1 NPP decommissioning technology to the radiation burden both under normal operating conditions and under emergency conditions or otherwise non-standard operating conditions is minimum (it was not necessary to propose a disaster area for this facility for extraordinary events as a result of leakage of hazardous pollutants, which would reach beyond the Proponent´s site; the maximum effective dose calculated for all the Proponent´s facilities in this location for the year 2011 was 7.01E-08Sv, and concerns the uninhabited sector 1 north from the RAWPTT site, and is several orders of magnitude lower than the limit set by the PHA SR for only RAWPTT and A1 NPP together with ISFSF).

A brief summary of the conclusions of the previous chapters suggest that there is no reason to expect any negative impacts that would reach beyond the state borders.

It should be mentioned in this regard that in connection with the plan of disposal of radioactive waste from stage II of A1 NPP decommissioning, the **European Commission,** in line with Article 37 of the Euroatom Treaty, issued an opinion dated 09 June 2009 which concludes that in respect of the given activity the Commission has come to the conclusion that the activity **is not expected to cause radioactive contamination of water, soil or air in another Member State** either during normal operation or in the event of an accident of the described extent and scope (the full text of the opinion including accompanying report is available at the Proponent upon request).

8. INDUCED CONDITIONS THAT MAY CAUSE IMPACTS WITH REGARD TO THE CURRENT STATE OF THE ENVIRONMENT IN THE AFFECTED AREA

No such conditions have been identified.

9. OTHER RISKS RELATED TO THE IMPLEMENTATION OF THE PROPOSED ACTIVITY

Given the design of buildings and facilities and the qualification and training of the personnel, the effect of an operating event caused by an internal factor will be restricted only to the given operating unit. No event induced by an internal agent will break the integrity of the building, and the consequences of events can be eliminated by technical means in the individual RAWPTT buildings without affecting the environment.

Initiation events caused by external factors are considered as the most serious ones from the point of view of discharges to the atmosphere and hydrosphere: earthquake over 8°MS, plane crash, explosion (hydrosphere) and fire (atmosphere). The radiation burden was calculated for both emergency scenarios; the levels of intervention and the guide values for the levels of intervention for immediate and subsequent measures pursuant to Government SR Regulation No. 345/2006 Coll. are not expected to be exceeded, nor the limits for irradiation of inhabitants of the surrounding areas with sources of ionising radiation pursuant to Articles 15 and 16 of Government SR Regulation No. 345/2006, i.e. 1mSv.

10. MEASURES TO MITIGATE THE ADVERSE ENVIRONMENTAL IMPACTS OF THE DIFFERENT OPTIONS OF THE PROPOSED ACTIVITY

All the required safety and operation documentation for the running of the activity has been prepared, all consents and decisions have been issued, and the mandatory monitoring has shown the ability of the facility to meet the set limits.

Further to the specific situation described above, it is recommended, in connection with the expected impacts and other possible risks associated with the implementation of the activity, to consistently comply with all the conditions stipulated in the decisions and consents, and to abide by all internal regulations (operating regulation, emergency plan, etc.).

11. ASSESSMENT OF THE EXPECTED DEVELOPMENTS IN THE AREA IN CASE THE PROPOSED ACTIVITY IS NOT IMPLEMENTED

If the proposed activity was not implemented, no related impacts would occur in the affected area. However, the disposal of waste from the A1 NPP, shut down after the accident in 1977 and currently in stage II of decommissioning, would remain unsolved, just as the disposal of low and medium activity RAW produced during various activities not only in nuclear facilities, which would result in negative environmental impacts and related risks.

12. ASSESSMENT OF THE PROPOSED ACTIVITY´S COMPLIANCE WITH THE CURRENT LAND-PLANNING DOCUMENTATION AND OTHER RELEVANT STRATEGIC DOCUMENTS

The proposed activity complies with the applicable land-planning documentation.

13. FURTHER STEPS IN IMPACT ASSESSMENT AND IDENTIFICATION OF THE MOST SERIOUS PROBLEMS

The requirements concerning the assessment of the given activity will be specified within the set scope of assessment on the basis of the opinions by the affected and approving authorities.

V. Comparison of the Proposed Activity Options and Proposal for an Optimal Option (Including Comparison with the Zero Option)Chyba! Záložka nie je definovaná.

1. DEFINITION OF THE SET CRITERIA AND DETERMINATION OF THEIR IMPORTANCE FOR THE SELECTION OF THE OPTIMAL OPTION

The definition of the assessment criteria has been based on the prediction that any activity within the given area can have an impact on the condition of any part of the environment, and on the ecological landscape features and socio-economic features of the given area

With regard to the character of the proposed activity, the impacts caused by the presence and treatment of radioactive materials, including their transport, and the impacts caused by the RAW incinerator operation, can be in general defined as the most important assessment criteria, since this processing technology also produces specific non-radiation outputs. The importance of the proposed activity for the safety and complexity of the disposal of RAW – not only from A1 NPP decommissioning – is also a significant assessment criterion.

2. SELECTION OF THE OPTIMAL OPTION OR DETERMINATION OF THE ORDER OF APPROPRIATENESS FOR THE ASSESSED OPTIONS

The proposed activity is presented for assessment purposes as one variant ***(option 1),*** which includes operation of a technology set for RAW processing and treatment used in A1 NPP decommissioning and in the treatment of low- and medium radioactivity RAW generated during these activities, as well as in other operating units disposing of radioactive materials (NPP, research, medicine, etc.).

The abandonment of the alternative solution was requested by letter No. 2012/12343 of 09 August 2012. The MoE SR approved the request by letter No. 7243/2012 of 02 October 2012.

Pursuant to the law, the other option subject to assessment is the ***zero option*** (do nothing) representing the state where the proposed activity is not implemented at the given area.

Order of suitability of the proposed activity options:

Option 1
Option 0

The preliminary comparison of the assessed options of the proposed activity, comprising an overall assessment of the individual induced impacts and effects, implies that ***the existence of the activity seems to be a more optimal solution due to the creation of low and medium activity RAW generated in the process of decommissioning of A1 NPP and of other nuclear facilities or other human activities (research, medicine, etc.).***

3. JUSTIFICATION OF THE OPTIMAL OPTION PROPOSAL

The respective activity creates a space for comprehensive and safe disposal of low and medium activity RAW produced during NF operation and decommissioning (currently ensured by RAW technology mainly in the process of A1 and V1 NPPs decommissioning).

The technology set is optimised and is designed in such way that the final outputs are materials (soil, concrete, metals) which can be discharged to the environment given the level of their activity (reduced by the applied processes), and RAW fixed in fibre-concrete containers with a cement mixturein order to meet the limit values and conditions for their storage, transport and deposition at the NRAWR in Mochovce.

At the same time, the technology can handle all the RAW produced during waste processing and treatment.

Given the nature of the activity, and the distance and location of the closest non-industrial built-up area, and location of the respective buildings within the Jaslovské Bohunice NF compound, noise emissions from the installed technological equipment, emissions of common sewage and rain waste waters (treated at the mechanical and biological WWTP or ORL, discharged in compliance with the relevant decision), etc. have small negative effects in the affected area, or their intensity, timespan and territorial reach are small. The same applies to the impacts related to the production of acceptable amounts of common operating waste (predominantly recyclable), the impacts on the landscape, scenery, image, etc.

Among negative impacts, only the impacts related to the radiation burden of the area generated by the facility, the induced traffic load, and emissions of common pollutants from waste incineration appear as potentially of higher significance.

The results of assessment of the radiation impacts and discharges from the RAWPTT and A1 NPP facilities suggest that the facilities comply with the set limit within a big margin, and the effective dose per inhabitant generated by all the Proponent´s facilities at the location is by several orders of magnitude lower than the effective dose limit set by the PHA SR (in 2011) for the given facilities (including TWSF).

As for the radiation burden caused by RAW transport, we can conclude that all the legislative requirements for radiation protection of inhabitants have been observed. RAW transport outside of the NF site is mainly transport of FCCs with treated and fixed RAW to be deposited at the NRAWR.

In general, with respect to the related traffic load, including resulting noise, it can be concluded, taking into consideration a conservative approach (i.e. assessment of maximum traffic frequency) that the contribution of the given activity to the traffic load in the monitored section of the affected area as a result of the traffic connection of the Jaslovské Bohunice NF site was only 3.7% of freight transport and 0.5% of overall transport in the year of the last assessment.

With regard to the impact of emissions of common pollutants from waste incineration, we can preliminarily conclude that the basic requirements for reduction of such emissions to an acceptable level have been met, such as treatment of flue gases, monitoring of compliance with the set emission limits, as well as fulfilment of the basic condition for ensuring dispersion of discharged pollutants through sufficient chimney height also for emission flows in the case of the worst permitted emission situation. The impacts on the population are also reduced by a reasonable distance of the incineration facility from the closest urban zones.

On the other hand, the existence of this complex facility at the Jaslovské Bohunice NF location as an important site of RAW production and the location of the A1 NPP in the process of decommissioning, with the design meeting all safety requirements for the operation of such facilities, represent an important positive impact on the process of RAW treatment, and indirectly on the impacts induced by their existence.

Overall, it can be concluded that the proposed activity, from the point of view of all assessed aspects—environmental, technical & technological, as well as socio-economic—provided that the set limits and operation conditions are respected, seems to be the optimal solution for the processing and treatment of low and medium activity RAW from NF facilities and from A1 and V1 NPPs decommissioning.

VI. Maps and Other Graphic Documentation

Annex 1 Map of the facility location within the area of NF Jaslovské Bohunice
Annex 2 Illustrative photo-documentation of the facility

VII. Additional Information about the Plan

1. List of Texts and Graphic Documentation Prepared for the Plan, and List of Main Documents Used

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and other.

2. List of Requested Statements and Opinions on the Proposed Activity Before the Plan Preparation

By the date of submission of the Proposed Activity Plan, the affected and approving authorities issued all the required consents and decisions for the facility operation (refer to Chapter II.16), which is the result of the specific situation described in the introduction to this document.

Further to the justified request of the Proponent by letter No. 7243/2012 of 02 October 2012, the competent authority withdrew from its requirements that it be presented with an alternative option.

3. Other Additional Information about the Current Process of Proposed Activity Preparation and Assessment of its Expected Environmental Impacts

Refer to Introduction, p. 7.

Works (including preparatory works) are currently performed to execute the changes described above (Chapter II.8). The MoE SR issued Opinion No. 5237/2010-3.4/hp of 24 August 2010 on the changes to be made in the incinerator of the BRAWTC and in the BL, stating that the proposed changes would not have a significant negative impact on the environment, or that the respective changes fall under a separate assessment process (e.g. increasing the capacity of the large capacity decontamination line).

VIII. Place and Date of the Plan Preparation

BRATISLAVA, 26 OCTOBER 2012

IX. Confirmation of Information Accuracy

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Translator´s Clause
The translation is registered under reg. ***No. 436/2012*** *of the Translator´s Journal.*
The translation was prepared by me, sworn translator registered in the register of experts, interpreters and translators of the Ministry of Justice of the Slovak Republic, section: English language, under Translator´s reg. No. 970160.

In Bratislava, date: 5th December, 2012

PhDr. Daniela Kardošová