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ABBREVIATIONS AND SOME TERMS:

ADR	European Agreement Concerning the International Carriage of Dangerous Goods by Road
ALR	Agricultural land reserves
BAAO	Building of active auxiliary operations
BL	Bituminization line
BRAWPC	Bohunice Radioactive Waste Processing Centre
BW	Building work
CZ	Controlled zone
DS	Dangerous substances
FCC	Fibre-concrete container
FLR	Forest land reserves
FP LRAW	Final Processing of Liquid Radioactive Waste
JAVYS, a. s.	Jadrová vyraďovacia spoločnosť, a.s. (Nuclear Decommissioning Company)
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
NRA SR	Nuclear Regulatory Authority of the Slovak Republic
NRAWR	National Radioactive Waste Repository
OU	Operating unit
PHA SR	Public Health Authority of the Slovak Republic
PS	Polluting substances
RA	Radioactive
RAS	Radioactive substances
RAW	Radioactive waste
RC	Radiation control
RP	Radiation protection
SE a. s.	Slovenské elektrárne a.s.

SE-EMO	SE a.s., Atómové elektrárne Mochovce, závod (SE a.s., Mochovce Nuclear Power Plant)
SPS	Solid polluting substances
SRAW	Solid radioactive waste
VOC	Volatile organic substances

RAW PROCESSING – an activity aimed to separate radionuclides from radioactive waste, change the composition of radioactive waste and reduce its volume in order to increase safety and the economic effectiveness of waste disposal;

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

INTRODUCTION

The nuclear facility Final Processing of Liquid Radioactive Waste (FP LRW) Mochovce has been constructed as a logical technological node of SE-EMO installations by its operator – Slovenské elektrárne, a. s., since according to the relevant legislation LRAW can be transported for processing only via pipelines (with the exception of cases where it is technically non-viable or economically unbearable, Art. 4, par. 3 of NRA SR Decree No. 30/2012 Coll.).

Since Government Resolution No. 537/1997 delegated the responsibility for the treatment of radioactive waste and spent nuclear fuel and for the storage of contaminated radioactive materials within the SR to the company Slovenské elektrárne, a.s. – Vyraďovanie jadrovo-energetických zariadení (SE-VYZ o. z.)—currently Jadrová a vyraďovacia spoločnosť, a.s.— the facility operation was handed over to the Proponent.

For the purpose of environmental impact assessment, the documentation concerning the completion of SE-EMO units 3 and 4 considered the FP LRAW facility management as an inseparable part of the strategy for the treatment of selected types of liquid radioactive wastes (concentrates and saturated ion exchangers and sorbents) from the NPP installations in Mochovce, and the documentation has also been assessed under the strategic document *Strategy of the Final Part of Nuclear Energy* of the National Nuclear Fund.

Since the Proponent is fully aware of the low level of details in the assessment of the facility as a part of the nuclear power plant technological system or a set of facilities in the SR designed for the treatment of radioactive materials in the final part of nuclear energy use, and also for administrative and formal reasons, upon consideration and consultations with the relevant and approving authorities, it has re-launched an independent process of assessment of the given activity´s impact on the environment and on the affected population.

I. BASIC INFORMATION ABOUT THE PROPONENT

1. Name

Jadrová a vyraďovacia spoločnosť, a.s.

2. Identification Number

Business identification number (IČO): 35 946 024

3. Registered Seat

Tomášikova 22
821 02 Bratislava

4. Authorised Representative of the Proponent

Statutory representatives:

Ing. Peter Čižnár - Chairman of the Board of Directors and General Manager

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Phone no.: +421/33 531 5340

Ing. Miroslav Obert – Vice-Chair of the Board of Directors and Director of V1 Decommissioning and PMU Division

E-mail: obert.miroslav@javys.sk

Phone no.: +421/33 531 5266

Ing. Anton Masár – Member of the Board of Directors and Director of Business and Trade Division

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Person authorised to conduct the EIA process:

Ing. Branislav Mihály – Head of the Radiation Protection Section

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5. Contact Person

Ing. Dobroslav Dobák *– specialist, spokesperson*

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ADDRESS: Jadrová a vyraďovacia spoločnosť, a.s.
Tomášikova 22
821 02 Bratislava

II. BASIC INFORMATION ABOUT THE PROPOSED ACTIVITY

1. Title

FINAL PROCESSING OF LIQUID RADIOACTIVE WASTE BY JAVYS, A.S. AT MOCHOVCE LOCATION

2. Purpose

The purpose of the assessed activity is the processing and treatment of liquid radioactive waste (LRAW) produced by SE-EMO installations in the form of radioactive concentrates, saturated sorbents and sludge at a maximum volume of 870 m^3/year of concentrates and 40 m^3/year of sorbents and sludge.

The final product of LRAW processing is a bitumen product in barrels inserted in fibre-concrete containers (FCCs) with a cement filler complying with the limits and conditions for transport and storage at the National Radioactive Waste Repository in Mochovce.

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. 2012/11868 of 03 August 2012. The request was approved by letter of the Ministry of Environment of the SR No. 4554/2012-3.4/hp dated 10 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 on 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 SE-EMO location.

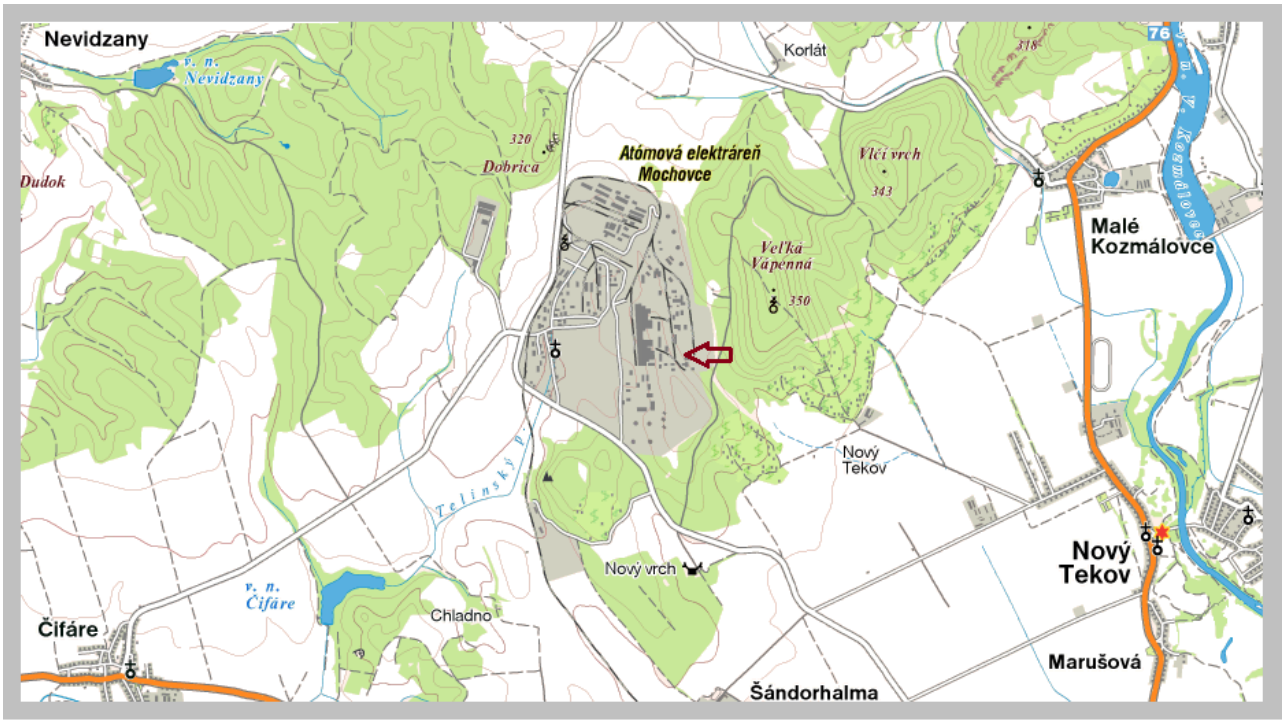
5. Location of the Proposed Activity

Region: Nitra
District: Levice
Municipality: Nový Tekov
Cadastral territory: Nový Tekov

Plot no.: 1751/4, 1751/82

The site of the given activity is situated in the south-eastern part of the SE-EMO site. The land is owned by Slovenské elektrárne, a.s.

6. Overview of the Proposed Activity Location



Legenda: ⇨ orientačné označenie umiestnenia činnosti

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

The use of the FP LRAW nuclear installation was permitted by Decision of NRA SR No. 139/2009 of 01 June 2009.

The designed total life of the construction is approx. 50 years. The first major innovation of the main technological equipment (e.g. film rotor evaporator, condensing evaporator, mixer, dryer, homogenizer, bitumen pumps, etc.) and the replacement of worn parts is expected within 10 to 15 years depending on their wear-out, which will vary considering the fact that the individual pieces of equipment are not used with the same intensity.

8. Brief Description of the Technical and Technological Solution

BUILDING SOLUTION

The FP LRAW facility is located in the building SO 808/1-01 which forms the production and operation complex situated within the immediate vicinity of building SO 801/1-91 (at the eastern facade) – the Building of Active Auxiliary Operations.

The FP LRAW building has one ground floor and five above-ground floors, and from the point of view of construction it is divided into four dilatation-free units:

Unit A – production facilities;

Unit B – administration facilities, connecting personnel bridge;

Unit C – auxiliary operations, roofing over the bitumen tank;

Unit D – storage hall, cargo lift and connecting conveyor bridge;

The building as a whole is part of a controlled zone, and only the administrative part and the supply air-conditioning engine-room are included in the free zone.

The processed LRAW is carried to the FP LRAW facility via pipelines from building SO 801/1-01 – Building of Active Auxiliary Operations.

The supply of other media required for the operation of FP LRAW technology (e.g. cooling water, demineralised water, compressed air, nitric acid, sodium hydroxide, etc.), and the discharge of waste waters produced in the process of RAW processing and treatment is also ensured via pipelines connected to the respective SE-EMO building.

TECHNICAL AND TECHNOLOGICAL SOLUTION

The supplied RA concentrates, sorbents and sludge aimed for processing are collected in tanks in the FP LRAW building.

RA ***concentrates*** are pumped from the heated tank to be condensed by evaporation on the concentration evaporator, and their pH is adjusted by adding HNO_3.

The evaporator works as a circulating device with natural liquid circulation in the operating pipelines. The produced vapour is separated from the liquid in the upper chamber of the evaporator, and the condensed concentrate is carried via emerged concentrate vapour to the separator's cyclone where they get separated. The emerged concentrate vapour condensates and is collected in the bulk tank for emerged vapour condensates and is carried to the condensed concentrate tank under normal operating conditions. The condensed concentrate is conducted to the diffusion ring in the upper part of the film rotor evaporator. The next step is bitumen and then liquid concentrate spray application on the evaporator. Salts fixed in the bitumen flow out from the film rotor evaporator neck through the filling device into 200l barrels which are sealed after being cooled off.

In the case of ***saturated sorbents and sludge,*** the suspension (5-7% dry matter content) is dosed into the decanter where it is drained—the thickened suspension with approx. 40% dry matter content is discharged by gravity force and is used to fill the dryer (the liquid fraction from the decanter is discharged into the tank with liquid fraction and emerged condensate), where water evaporates to reach less than 8% of the weight (the process takes approx. 12-15 hours). Bitumen with polyethylene (to increase viscosity) is subsequently added to the dried mixture supplied to the homogenizer, and, after mixing, the new mixture is filled into 200l barrels.

The ***bituminization lines*** are operated in campaigns. Five concentrate treatment campaigns and one campaign for saturated sorbents and sludge are planned within a year.

The barrels containing bitumen products are subsequently (due to the campaign-based operation of the bituminization lines the ***cementation line*** is also run in campaigns) placed in FFCs and covered with a cement filler (for the preparation of which RA concentrates are also used); thus prepared, they represent the final packing unit as the result of the technological cycle of RAW treatment at FP LRAW Mochovce, and are transported and disposed at the NRAWR Mochovce.

The waste water from the evaporation of condensates and from the draining of sorbents and sludge is conducted away to the waste water tank where all active waters from the FP LRAW facility are collected. ***Active waste waters*** are subsequently pumped off from the tank to be processed in the SE-EMO system.

The facility venting is ensured by means of the ***air-conditioning system*** with an effective two-step air filtering process that uses aerosol filters. Air is conducted to the SE-EMO venting chimney with monitored discharge.

Besides ***radiation control*** of the work environment (monitoring of dose inputs, aerosols in the air, contamination of working platforms and equipment, contamination of personnel), radiation control of the technological process is also performed through the measurement of surface contamination by RAW (FFC, barrels, etc.), as well as output measurement of active RAW to be transported to the disposal site or to the Bohunice RAW processing centre; measurement of the overall activity of bitumen barrels (gamma scanner measuring the overall activity of ^{137}Cs); measurement of the cooling water volume activity; and output radiation control of cars.

At present, preparatory works are in place to ***change the technology*** by creating a pipeline connection that would enable the pumping of active waste waters (active waste waters are currently pumped off solely to be disposed at SE-EMO) into concentrate storage pools, and conducted from there to the condensation technological system to create active cement fillers. After being condensed on the circulation evaporator and mixed with the concentrate from SE-EMO, active waste waters can be used to produce active cement fillers for FCCs on the cementation line. The purpose of the planned change is to reduce to the greatest extent possible the release of liquids from the FP LRAW facility into the environment.

Another planned technology change concerns adjustment of the pipeline route of cement filler draining from the mixing core to the fibre-concrete container. The planned new route will have a much bigger gradient and the filler will be conducted by gravity with the help of mixer blades. The aim of the proposed pipeline route adjustment is to promote radiation protection of the operating staff by reducing personal doses, since the adjustment will prevent clogging of the draining route of the active cement filler and the need to clean the pump.

The MoE SR issued its Opinion No. 6031/2012-3.4/hp of 15 June 2012 stating that the planned change would not have a negative impact on the environment and on people's health, but it recommended to repeatedly assess the given activity in a comprehensive manner due to the insufficient assessment thereof under other affected assessment processes (e.g. completion of SE-EMO units 3 and 4).

PROCESSED WASTE AND PROCESSING CAPACITY OF FP LRAW

The FP LRAW facility processes liquid RAW from the SE-EMO site, such as radioactive concentrates, saturated sorbents and sludge (excluding radioactive oils and organic solvents).

The basic characteristics of input LRAW aimed for processing at FP LRAW are provided in the table below.

Table II.8./01

Data about LRAW from SE-EMO site

Indicator	***Concentrate***	***Medium activity sorbents***	***Low activity sorbents***
Activity	10^6 - 10^8 Bq/dm^3	4.10^7 - 4.10^9 Bq/dm^3	4.10^2 - 4.10^4 Bq/dm^3
Isotopic composition	90% ^{137}Cs, 10% ^{60}Co	80% ^{137}Cs, 20% ^{60}Co	100% ^{137}Cs
Salinity	average 200g/dm^3		

(Source: SE-EMO Initial Project for 2 x 440MW)

The weight proportion of sorbents and sludge in the processed suspension is 7:3, and the average dry matter volume in the suspension is approx. 390g/dm^3.

From the point of view of capacity, the maximum designed capacity of LRAW processing and treatment with bituminization technology and storage at FCCs (barrels + filler) is 870m^3/year of radioactive concentrates and 40m^3/year of sorbents and sludge.

For an optimal filling of radionuclide stock in the final product (FCC) and with regard to an effective use of the National RAW Repository capacity, the FP LRAW facility can potentially serve also for the cementation of RAW fixed at other RAW processing and treatment facilities in Jaslovské Bohunice.

Moreover, the FP LRAW facility also serves for the management of solid RAW produced at FP LRAW and SE-EMO facilities and for their transport from Mochovce location for the purpose of their processing in the Bohunice Processing Centre in Jaslovské Bohunice, which is also run by the Proponent.

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

The installed technology for LRAW processing and treatment has been situated in the given location as a further logical step in the treatment of liquid radioactive waste produced by SE-EMO installations, since LRAW can only be transported from nuclear facilities via pipelines (with the exception of cases where it is technically non-viable or economically unbearable, Art. 4, par. 3 of NRA SR Decree No. 30/2012 Coll.).

According to the design of the technological system, the treatment of LRAW excludes the need to carry the transportable bituminization intermediate product for its further treatment (cementation in FCC), i.e. the output product of the FP LRAW technological system is the final packing unit (FCC) containing treated RAW, which can be subsequently stored directly at the NRAWR Mochovce situated at a geodesic distance of approx. 3km.

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:

- Nový Tekov (Levice District, Nitra Self-Governing Region)

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

- Malé Kozmálovce, Veľký Ďur, Starý Tekov (Levice District, Nitra Self-Governing Region)
- Nemčiňany (Zlaté Moravce District, Nitra Self-Governing Region)

Municipality in the cadastral territory of which the SE-EO site is situated and to the transport and technical infrastructure of which the FP LRAW facility is connected:

- Kalná nad Hronom (Levice District, Nitra Self-Governing Region)

12. Affected Self-Governing Region

Nitra Self-Governing Region

13. Affected Authorities

District Environmental Office Levice
District Environmental Office Zlaté Moravce
Regional Environmental Office Nitra
Regional Public Health Office in Levice
Regional Public Health Office in Nitre
Regional Directorate of the Fire and Rescue Corps Nitra
District Office Levice, Civil Protection and Crisis Management Department
District Office Levice Zlaté Moravce, Civil Protection and Crisis Management Department
District Office for Road Transport and Land Communication Levice
District Office for Road Transport and Land Communication Zlaté Moravce

14. Approving Authority

Nuclear Regulatory Authority of the SR
Public Health Authority of the SR

15. Departmental Authority

Ministry of Economy of the SR

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

The FP LRAW Mochovce nuclear facility as an operating facility currently disposes of all the required permits and consents, the most important being the following:

- ✓ NRA SR Decision No. 329/2007 of 04 October 2007 on issuing the permit for the operation of FP LRAW nuclear facility and the permit for RAW treatment in the FP LRAW nuclear facility within the scope of the Pre-Operation Safety Report for the FP LRAW nuclear facility;
- ✓ NRA SR Decision No. 139/2009 of 12 May 2009 on permitting the use of FP LRAW Mochovce facility;
- ✓ NRA SR Decision No. OOZPŽ/3190/2012 of 26 April 2012 on permitting the activities causing irradiation (RAW treatment, RAS release from administrative control by being discharged together with exhausts to the vent chimney of Mochovce NPP, and of liquid RAS by being discharged to Mochovce NPP technology), and on laying down the conditions for the performance of these activities.

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 disposal and processing" are subject to such assessment.

The technology described above meets 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), as well as the definition of RAW treatment (RAW cementation for FCC): "The result of radioactive waste treatment is a packed form of radioactive waste prepared in compliance with the requirements for safe handling, warehousing, transport and storage. The packed form of radioactive waste can also include a packing unit." (Art. 8).

Hence, in spite of the fact that the given technology represents, due to its 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.

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

1. DESCRIPTION OF THE NATURAL ENVIRONMENT INCLUDING PROTECTED AREAS

The FP LRAW facility does not represent a source of any serious impacts on the different parts of the environment or on the population (for more details refer to Chapters IV.1., IV.2., and IV.3.).
Based on this fact, and since the activity directly affects only the atmosphere and hydrosphere as component parts of the environment (the FP LRAW facility represents limited waste production with minimum radioisotope discharge into the air and surface waters), only a brief description thereof is provided below.

1.1. Definition of the Borders of the Affected Area

The affected area of SE-EMO is situated within the territory of the former municipality of Mochovce, which was demolished and the municipality inhabitants resettled due to the construction of the nuclear installation (a late-baroque church and a cemetery are the only sites that have remained in the municipality area). Its cadastral territory now falls under the municipality of Kalná nad Hronom.
Some SE-EMO buildings, including the FP LRAW building, are located on plots belonging to the cadastral territory of the municipality of Nový Tekov. Both municipalities are parts of Levice District in the Nitra Self-Governing Region.

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 FP LRAW facility site (for the reasons refer to Chapters IV.3.1. and IV.2.5.).

The other municipalities located within the affected area, as described for the purposes of this document (refer to Annex 1), are the following:

- Malé Kozmálovce, Veľký Ďur, Starý Tekov (Levice District, Nitra Self-Governing Region);
- Nemčiňany (Zlaté Moravce District, Nitra Self-Governing Region).

1.2. Climate Conditions

From the point of view of climate geography, the affected area can be characterised as lowland, predominantly warm, dry to moderate dry climate with moderate temperature inversion.

Precipitations

The precipitations in the affected area are predominantly vertical precipitations. Their average annual amount is 550 to 600mm.

Temperatures

During a ten-year period (1994-2004), the average annual temperature was between 9.6 – 11.0ºC. The coldest month of the year was January when the average daily temperatures reached -3.7 to 2.0°C. According to the measurements in that period, the highest temperatures were recorded in July, gradually decreasing until the end of the year.

Winds

According to the SHMÚ Bratislava data, north-west and north-east air flows are dominating in the given area. The maximum average wind speed is 3.6m/s, the minimum is 2.9m/s, and the average wind speed is 3.3m/s.

1.3. Hydrological Conditions

The SE-EMO site is part of the Nitra river basin, but the Hron river is the source of service water (Veľké Kozmálovce water reservoir) and waste water recipient. The river basin distribution line runs along the ridge of the Kozmálovské vŕšky hills.

1.4. Hydrogeological Conditions

The richest source of ground waters is the Hron river flat with watered gravel or sand with up to 20m thickness. These collectors rich in ground water are separated from Mochovce NPP by Kozmálovské vŕšky.

The ground water in quarternary deposits within the Mochovce NPP site does not form a coherent watered area.

2. CURRENT QUALITY OF THE ENVIRONMENT

2.1. Air Pollution

The following large and medium sources of pollution can be found in the cadastral territory of Mochovce, in the cadastral territory of the municipality of Kalná nad Hronom (attraction zone) and in the affected cadastral territory of Nový Tekov, as recorded in the NEIS system (National Emission Register System).

Table III.4.1./01

Overview of air pollution sources in selected municipalities in the surrounding of the affected location

Cadastral territory	*Source ID*	*Source name*
Kalná nad Hronom	823112	Boiler-house – business vocational school Kalná nad Hronom
Kalná nad Hronom	823112	Pumping station Kalná
Kalná nad Hronom	823112	Boiler house
Kalná nad Hronom	823112	Pumping station Jurki Kalna
Kalná nad Hronom	823112	Grain kiln
Mochovce	838152	Diesel generator station
Mochovce	838152	Boiler house GDT
Mochovce	838152	Locksmith shop boiler room
Mochovce	838152	Boiler house Oblicovka
Mochovce	838152	Boiler house Tesáreň
Mochovce	838152	Boiler house SA-3
Mochovce	838152	Boiler house Šala
Mochovce	838152	Boiler house PSV
Mochovce	838152	Main boiler house
Mochovce	838152	Guard area boiler house
Mochovce	823112	Auxiliary commissioning boiler house
Nový Tekov	842931	Pig breeding N. Tekov

(Source: NEIS, 2008)

The pollution situation is not monitored in the affected area. The closest monitoring stations are located in Topoľníky (regional network station for the monitoring of regional air pollution and chemical composition of rainfall waters), Žiar nad Hronom and Bystričany (automatic air pollution monitoring stations).

Besides common pollutants the air in the affected area is also polluted by ***gaseous discharges of radionuclides*** from SE-EMO installations, which are monitored and evaluated according

to the set guide values (annual limits). The data is regularly published (together with the evaluation of liquid radioactive discharges) on the website http://www.seas.sk/sk/spolocnost/zivotne-prostredie/vplyv-prevadzok/atomove-elektrarne-mochovce.

Air pollution by radionuclide emissions from the FP LRAW facility is monitored separately (refer to Chapter IV.2.1.1.). The outcomes are published at the Proponent´s website.

Within the control of the impacts of gaseous radioactive discharges, the activity of aerosols (at 15 measuring points, period of filter exposition: one week) and the activity of pollutants (at 16 measuring points, take-off frequency: three months) are also evaluated in the framework of the Mochovce NF monitoring programme. For example, in the first quarter-year of 2012, no SE-EMO impacts were recorded in relation to pollutants (including FC LRAW facility), and no limit value was exceeded. No SE-EMO impacts were recorded in relation to aerosol activity either.

2.2. Water Contamination

GROUND WATERS

The closest bore holes in the given location for the monitoring of ground water contamination by common pollutants are situated at the Hron river alluvium (SK1000700P Intergranual ground waters of quarternary sediments of the Hron river). In these bore holes (in the middle part of the Hron water-flow), the indicators concerning Mn, Fe, SO_4^{2-}, NH_4^+, CHSK-Mn and Na^+ especially do not meet the limits laid down in the relevant government decree (Source: UP of Nitra Region, V. Hrdina a kol., 2012).

SURFACE WATERS

Since the affected area is part of the Nitra (Telinský potok, prítok Žitavy) and Hron river basins, Table III.4.2./01 shows the water quality category for the Žitava and Hron water-flow sections as per indicator groups.

Table III.4.2./01

Quality categories of surface water-flows Žitava and Hron in the period 2001-2002

Station	Biological indicators	Physical and chemical indicators	Oxygen regime	Micro-biological indicators	Micro-pollutants	Nutrients
Žitava	III.	II.	III.	IV.	IV.	III.
Hron	III.	III.	III.	IV.	IV.	V.

(Source: SHMÚ, 2003)

The waters in the affected area are contaminated with liquid discharges from SE-EMO (including FP LRAW) and rain-water draining from the NRAWR. As described above,

discharges from SE-EMO are regularly monitored, and the data evaluation results are being published—refer to Chapter III.4.1 (for more details about FP LRAW refer to Chapter IV.2.2.).

The contamination of liquid discharges by common pollutants is also monitored, evaluated and published.

The impacts of radioactive discharges in the form of surface, drinking and ground waters are monitored in the framework of radiation control of the SE-EMO installations: in nine monitoring profiles for surface waters covering the water-flows Hron, Telinský potok and Širočina (quarterly monitoring), at five monitoring points for drinking waters (quarterly monitoring), and at six monitoring points for ground waters (quarterly monitoring). In Q1 2012, no set limit values were exceeded and no impacts of the SE-EMO facility (including FP LRAW discharges) were recorded.
The activity of river sediments is also followed (for gamma-spectrometric analysis – quarterly; for 90Sr analysis – annually, at seven monitoring points). In the given period, no set limit values were exceeded and no impacts of the SE-EMO facility (including FP LRAW discharges) were recorded

The NRAWR is also situated within the affected area. A total of 52 monitoring bore holes (ground waters) have been made in the vicinity of Mochovce NRAWR, from which samples are taken in line with the current schedule, and chemical and radio-chemical analyses are subsequently carried out. No exceeding of the set limits have been recorded with the measurement of the volume activity of water samples from radiation control bore holes at NRAWR.

2.3. Soil Contamination

It can be stated in general that the agricultural land reserve soils are contaminated with nitrogenous substances and heavy metals to a larger extent than forest land reserve soils, which is clearly related to the intensive use of agricultural lands and removal of the vegetation cover.

The radiation control of Mochovce NF location also monitors soil activity in the surroundings at 14 points (including NRAWR) twice a year and at IN-SITU localities once per year. The take-off layers for soil samples from IN SITU localities are 0-2cm, 2-5cm and 5-10cm. For other localities, a sample take-off layer of 0-5cm is uniform. In 2011, the set limits of 90Sr and 137Cs activity were not exceeded and no impacts of SE-EMO operation were recorded.

2.4. Noise and Vibrations

The biggest source of noise within the wider affected area with a negative impact on the inhabitants of the affected municipalities is intensive road and railway traffic. Noise from car traffic is dependent mainly on the intensity and composition of the traffic flow and from the features of the road route.

Noise from the Mochovce Nuclear Power Plant operation within the inhabited surroundings of the installations is negligible. The closest settlement is at a distance where the noise level from the power plant is practically at a zero level.

2.5. Radiation

In the surroundings of the Mochovce Power Plant, stable dosimetric stations (SDS) are installed at 15 locations and another station at the National Radioactive Waste Repository (NRAWR) in Mochovce run by the company JAVYS, a. s.

The ambient equivalent dose rates are regularly evaluated and the evaluation results are published on the above-mentioned website. For comparison, the website also publishes the dose rates measured at other "non-nuclear" locations.

Table III.4.6./01

Ambient dose equivalent

Príkony priestorového dávkového ekvivalentu

namerané **ionizačnou komorou** (IK) pri dozimetrických staničkách **29. 5. 2012,** priemerné príkony priestorového dávkového ekvivalentu za máj namerané TLD 100 a 200; Ø IK za roky 2007 – 2011.

[nSv/h]

Lokalita	IK	TLD 100	TLD 200	Ø IK za roky 2007 - 11
Levice - LRKO	-	82 ± 14	81 ± 11	-
Levice	84 ± 11	92 ± 15	92 ± 12	83 ± 10
Kalná nad Hronom	93 ± 10	95 ± 15	91 ± 11	95 ± 12
Nový Tekov	102 ± 12	96 ± 15	96 ± 12	97 ± 14
Malé Kozmálovce	100 ± 12	93 ± 15	94 ± 12	97 ± 11
Veľký Ďur	96 ± 12	102 ± 16	102 ± 12	95 ± 12
Čifáre	93 ± 10	87 ± 14	92 ± 12	89 ± 12
Vráble	81 ± 9	94 ± 15	97 ± 12	83 ± 16
Tajná	90 ± 11	100 ± 16	98 ± 12	87 ± 9
Červený Hrádok	85 ± 9	98 ± 15	94 ± 12	87 ± 9
Nemčiňany	91 ± 11	100 ± 16	97 ± 12	91 ± 11
Zlaté Moravce	93 ± 11	97 ± 15	90 ± 11	91 ± 9
Kozárovce	98 ± 8	105 ± 16	101 ± 12	96 ± 12
Rybník	101 ± 9	93 ± 15	90 ± 11	94 ± 12
RÚ RAO	80 ± 9	86 ± 14	83 ± 11	82 ± 11
SE-EMO	95 ± 12	87 ± 14	89 ± 11	96 ± 11

Priemerné hodnoty príkonu dávky v iných lokalitách SR	
Bratislava	94,7 ± 5,4
Štrbské Pleso	107,3 ± 9,3
Dudince	160,2 ± 28,0

*Rozdiely medzi jednotlivými lokalitami sú spôsobené variáciami prírodného pozadia. Namerané hodnoty sa štatisticky **nelíšia od hodnôt, nameraných pred spustením prevádzky.** **Príspevok JE** k celkovým dávkam **je zanedbateľný.***

2.6. 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 directly affected Levice District is 70.48 years in males and 79.31 years in females, and in the affected Zlaté Moravce District it is 79.31 years in females and 70.48 years in males, which represents lower life expectancy rates in males in the two districts compared to the national average of the SR.

The affected districts, as well as the entire region had a lower birth rate compared to the national average.

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, the affected Nitra region and both districts show lower 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 the case of Levice District, the indicator is above the national and regional average, and in the case of Zlaté Moravce District it is under the national and also regional 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.

The mortality rate in the affected districts in 2011 was higher than the national average; yet, both districts record a higher average age than the national average.

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

In addition to the data on designed inputs and outputs of the given activity, the following chapters contain information about the actual values of inputs and outputs of the FP LRAW nuclear facility in 2011, displayed in available (monitored) break-down as per processing equipment lines:

The following campaigns were conducted at FP LRAW in 2011:

- ✓ two campaigns of ion exchanger bituminization;
- ✓ two campaigns of concentrate bituminization;
- ✓ four cementation campaigns.

1. INPUT REQUIREMENTS

1.1. Occupation of Land

The given technology system for LRAW processing and treatment is located in the existing buildings of the SE-EMO site. Hence, the proposed activity does not require new occupation of land either from ALR or FLR.

1.2. Water Consumption

During the operation of LRAW processing and treatment technology, the ***drinking water*** consumption primarily depends on the drinking and hygienic needs of the staff. The FP LRAW premises are connected to the drinking water distribution network within SE-EMO. In 2011, the drinking water consumption in FP LRAW was 250m^3.

For the purposes of the activities carried out at FP LRAW, the facility is also connected to the distribution networks of:

- ✓ Demineralised water
  - *Used for the dilution of chemical additives in the bituminization process and for the washing of equipment;*
- ✓ Cooled water
  - *Used for the cooling of the air-conditioning system;*
- ✓ Technical cooling water
  - *Used for the cooling of condensers, operational concentrate tank and evaporator bed;*
- ✓ Heating water
  - *Used for heating during evaporation;*
- ✓ Vapour
  - *Used for the heating of tanks, e.g. concentrate and bitumen tanks.*

In all these cases, the media is supplied by SE-EMO and is supplied to the FP LRAW premises via connecting pipelines.

The planned consumption of the above-mentioned media, at full processing capacity of FP LRAW, is provided in the table below. The table also includes actual consumptions in 2011.

Table IV.1.2./01

Water consumption for technological purposes

Medium	***Max. temperature***	***Annual consumption*** with full processing capacity	***Annual consumption*** Year 2011
Cooled water	6°/12°C	57,970 t/yr	25,398t/yr
Demineralised water	25°C	50m^3/yr	15.58 m^3/yr
Heating water	130/70°C	28,790t/yr	234.70GJ
Vapour 2.7MPa	230°C	1,700t/yr	6,067.84GJ
Technical cooling water	25°/40°C	28,000m^3/yr	18,269 m^3/yr

The FP LRAW building is also connected to SE-EMO also by the ***fire water*** distribution network. The fire water supply system is separated from the drinking water supply system. The pressure in the fire water conduit is approx. 0.32–0.9MPa, and the fire water conduit within the SE-EMO site also serves as service water conduit.

1.3. Raw Material Sources

During operation of the nuclear facility, the main activity inputs are concentrates, saturated sorbents and sludge aimed for processing (refer to Chapter II.8.).

In order to be processed and treated to reach the final output in the form of FCC, the installations, provided that the capacity of the FP LRAW facility is fully used, require the use of the following raw materials, auxiliary substances and auxiliary materials (the designed consumption data is completed with actual consumption data in 2011).

Table IV.1.3./01

Balance of substances and materials for LRAW bituminization

Medium	***Amount per campaign*** (designed)	***Annual amount*** with full processing capacity	***Year 2011***
Concentrate	100m^3/campaign	500m^3/year	120.865
Bitumen CA70/100	29m^3/campaign	145m^3/year	35
Concentrated nitric acid (63%)	2m^3/campaign	10t/year	6.09
Cleaning agent		0.5m^3/year	0.3
Nitrogen (bottles 40dm^3)	8 bottles/ campaign	40 bottles/year	6
Active coal		0.27m^3/year	0
Barrels 200l	210 pcs/campaign	1,050 pcs/year	346

Table IV.1.3./02

Balance of substances and materials for the bituminization of saturated sorbents and sludge

Medium	***Volume per campaign*** (designed) **= *Annual amount*** with full processing capacity	***Year 2011***
Saturated sorbents and sludge	40m^3	5.91
Bitumen	13.5m^3	2.60
Polyethylene	1.42t	0.59
Flocculant I	25kg	0
Flocculant II	1kg	0
Sodium hydroxide 20%	50dm^3	0
Coagulant $FeSO_4$	1kg	0
Nitrogen (bottles 40dm^3)	16 bottles	6
Barrels 200l	155 pcs	55

Table IV.1.3./03

Balance of substances and materials in cementation

Process	***Medium***	***Amount per campaign*** *(designed)*	***Annual amount*** *with full processing capacity*	***Year 2011***
Cementation after the bituminization of liquid RA concentrates	Concentrate (non-condensed)	64.4m^3/campaign	322m^3/year	111.11
	Concentrate (condensed)	28.4m^3/campaign	142m^3/year	49
	Sodium hydroxide 20%	3m^3/campaign	15m^3/year	-
	Zeolite	10.7 t/campaign	53.5t/year	-
	Cement	25t/campaign	125t/year	44.1
	Calcic hydrate	4.6t/campaign	23t/year	7.35
	Fibre-concrete containers (FCC)	30 pcs/campaign	150 pcs/year	49
Cementation after the bituminization of RA sorbents and sludge	Concentrate (non-condensed)	47.2m^3/campaign	47.2m^3/year	18
	Concentrate (condensed)	20.8m^3/campaign	20.8m^3/year	8.2
	Sodium hydroxide 20%	2.2m^3/campaign	2.2m^3/year	-
	Zeolite	7.8t/campaign	7.8t/year	-
	Cement	18.3t/campaign	18.3t/year	7.2
	Calcic hydrate	3.4t/campaign	3.4t/year	1.2
	Fibre-concrete containers (FCC)	22 pcs/campaign	22 pcs/year	8

Table IV.1.3./04

Other auxiliary substances/media and their use

Medium	***Annual consumption*** (designed)	***Year 2011***	***Use***
Compressed air (0.6 ÷ 0.8MPa)	950m^3	1,387.46	For pneumatic drive of fittings and equipment
Acidic decontamination solution (1% oxalic acid solution and 1% citric acid solution)	3m^3	0	Decontamination of the individual pieces of technological equipment and rooms
Alkaline decontamination solution (1% sodium hydroxide solution, 0.5% potassium permanganate solution)	3m^3	0	ditto
Pure condensate—demineralised water with tritium contents	20m^3	118.65	ditto

The operating conditions did not require the use of some substances planned in the project in 2011, such as NaOH for the condensing evaporator cleaning (it has not been necessary since the launch of operation; NaOH can be replaced with citric acid), acidic and alkaline decontamination solution for the internal decontamination of technological equipment during overhauls, which has not been necessary so far either, etc.

1.4. Energy Sources

The proposed activity operation requires ***heat energy.*** However, the nuclear facility does not dispose of its own heat source. Heat energy is supplied via vapour (2.3MPa) and hot water (130/70^{o}C) by means of distribution pipes from SE-EMO (refer to Chapter IV.1.2.).

Electric energy supply is required for the operation of most part of the installed processing equipment, including security and support equipment, such as control systems, air-conditioning, lighting, monitoring, decontamination, etc.
Electric energy is supplied to FP LRAW by 6kV power mains from the building SO 529/1-01 ÚED of the SE-EMO site.
The consumption of electric energy for the purposes of FP LRAW operation in 2011 reached 949,946kWh. The planned electric energy consumption for maximum processing capacity of FP LRAW is 1,139,935kWh/year.

1.5. Transport and Other Infrastructure Requirements

Car transport to the FP LRAW building is subject to the power plant´s regime measures.

The affected SE-EMO site is connected to the superior transport system consisting of roads I/51 and I/76 within its vicinity via road III/511010 and connecting road III/051049.

The frequency of freight transport providing for the delivery of raw materials, auxiliary substances and materials for LRAW processing, and the transport of FCCs to NRAWR (only the above-mentioned 3rd class roads are affected) and waste produced in the facility is provided in the table below.

Table IV.1.5./01

Freight transport frequency

Transported materials	***Number of vehicles per year***	
	For full processing capacity	For year 2011
All auxiliary raw materials and chemicals (cement, bitumen, etc.)	Total 25	Total 13
Tank cars	*4*	*2*
Supplies	*2*	*1*
Freight cars	*19*	*10*
Empty packing materials—zinc-coated BARRELS with a lid and a ring	21	8
Empty packing material—FCC	86	40
Transport of filled FCCs	86	32
Transport of barrels with RAW to JB location	3	1
Transport of common waste (not RAW)	2	2 (1 NA for other waste, 1 NA for hazardous waste, NA will not be fully used)
Total	223	96

The planned frequency of personnel transport is irregular, culminating at the time of shift changes, depending on the number of employees with a maximum of 15 cars (i.e. 30 passes).

1.6. Labour Force Requirements

The LRAW operation is carried out by day and shift workers. Day workers include: Head of the FP LRAW Operation Department, FP LRAW operation technologist, administration technician (NF Machine Technology and Construction Department), specialist in NRAWR and FP LRAW operations (A1 Radiation Protection Department, TSÚ RAO and MSVP, dealing with decisions, monitoring discharges, etc.), radiation safety technician, and technologist of chemical regime control.
With regard to shift workers, they change in three 12-hour shifts: day-shift, night-shift and stand-in shift.
Each shift is carried out by:

- ✓ RAW disposal technician;
- ✓ Machinist for power equipment – RAW processing and treatment;
- ✓ Machinist for power equipment – auxiliary systems;
- ✓ Chemistry technician (Department of Chemical Regimes Control);

- ✓ Technician of radiation security of NRAWR and FP LRAW (Radiation Protection Department A1, TSÚ RAO and MSVP).

2. OUTPUT DATA

2.1. Air Pollution Sources

2.1.1. Spot Sources

The FP LRAW ***facility*** is not connected to any air pollution source under the legislation on air protection.

FP LRAW only releases waste air extracted from the operation premises. Waste air is conducted to the vent chimney of the SE-EMO site (150m high) by means of the air-conditioning system. The designed amount of air released at full processing capacity is approx. 65,000m^3/hour, of which approx. 60,000m^3 is generated in the protected zone. Gaseous RAS discharges in the extracted air come from the de-aeration of tanks and equipment containing active media. Air originating in these premises and extracted by means of the air-conditioning system is cleaned at aerosol filters with a 99.9% trap efficiency.

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

a) Strontium ^{90}Sr, ^{89}Sr;
b) Radionuclides emitting beta and gamma radiation: ^{54}Mn, ^{55}Fe, ^{57}Co, ^{60}Co, ^{65}Zn, ^{94}Nb, ^{110m}Ag, ^{125}Sb, ^{134}Cs, ^{137}Cs, ^{144}Ce;
c) Radionuclides emitting alpha radiation: ^{238}Pu, $^{239+240}$Pu, ^{241}Am

The PHA SR defined the following guide values (limits) for the above-mentioned radionuclide groups in connection with air discharges by the FP LRAW facility (Decision No. OOZPŽ/3190/2012 of 26 April 2012):

a) annually 2.0x10^6 Bq
b) annually 8.0x10^{7}Bq, quarterly 1.84x10^7 Bq
c) annually 1.0x10^6 Bq, quarterly 2.3x10^5 Bq
+ volume activity of beta and gamma aerosols 10 Bq/m^3

The following released air activity was monitored in 2011:

Table IV.2.1./01

Air discharges – FP LRAW Mochovce, year 2011

Air	Air discharges – FP LRAW Mochovce

discharges 2011	Monthly amount [10^6 m^3]	Beta and gamma [limit: 80MB			Alpha [limit: 1.0MBq]			^{90}Sr [limit: 2.0MBq]		
		Monthly value [MBq]	Annual value [MBq]	**Annual value [% lim.]**	Quarterly value [kBq]	Annual value [kBq]	**Annual value [% lim.]**	Quarterly value [kBq]	Annual value [kBq]	**Annual value [%z lim.]**
January	41.120	0.0009	0.0009	**0.0011**						
February	40.250	0.0009	0.0018	**0.0023**	0.104	0.104	**0.010**	0.21	0.21	**0.01**
March	41.260	0.0012	0.0030	**0.0038**						
April	40.820	0.0094	0.0124	**0.0155**						
May	41.640	0.0164	0.0288	**0.0360**	0.090	0.194	**0.019**	0.19	0.40	**0.02**
June	40.460	0.0085	0.0373	**0.0466**						
July	41.230	0.0096	0.0469	**0.0586**						
August	41.640	0.0145	0.0614	**0.0768**	0.140	0.334	**0.033**	0.48	0.88	**0.04**
September	40.960	0.0095	0.0709	**0.0886**						
October	41.530	0.0089	0.0798	**0.0998**						
November	40.860	0.0081	0.0879	**0.1099**	0.120	0.454	**0.045**	0.54	1.42	**0.07**
December	41.720	0.0075	0.0954	**0.1193**						

As shown above, the drawing of limits for gaseous discharges was minimal in 2011.

2.1.2. Line Sources and Mobile Sources

In 2011, 96 transports were carried out in connection with the facility (up to 32 transports concerned FCCs with fixed RA transported to the NRAWR situated at a geodesic distance of only about 3km). Under a conservative approach, 96 transports, which is a maximum of 192 drive-throughs (without using the two-way transport capacity of the motor vehicles used), during approx. 250 working days per year represent related traffic frequency of 0-1 freight cars/day.

If the full processing capacity of the facility is used, the estimated number of drive-throughs is max. 1-2 freight cars/day under the conservative approach.

2.2. Waste Waters

The FP LRAW facility produces inactive waste waters: sewage waters and rain waters; and active (technological) waste waters.

Sewage waters (at an amount corresponding approximately to drinking water consumption with a standard loss of about 20%) and rain waste waters (approx. 1,130m^3/year) are managed on a contractual basis by their draining into the internal sewer system of SE-EMO.

Active waste waters are produced by the FP LRAW facility by means of various activities.

In the process of bituminization of radioactive concentrates and bituminization of saturated RA sorbents and sludge, active waste waters are made of emerged condensates which are partly used to eliminate failures and are also used as a flushing medium; most part of the condensate remains in the form of active waste water. Active waste waters are also generated during the decontamination and cleaning of bituminization lines.

Other active waste waters are produced on the cementation line:

- ✓ during cementation line flushing;
- ✓ after completion of the cementation campaign from used decontaminating solutions;
- ✓ after the end of each shift, by spray-cleaning the concentrate scale and the mixer (using demineralised water).

After the solid particles have settled, part of the flushing water is used to produce new cement fillers; the remaining water is conducted away for disposal through the fine filters of cement particles.

Active waste water in the form of emerged condensate is also produced by concentrate condensation and by sorbent drying, and in the form of liquid fraction from the decantation of the ion exchanger and sludge suspension.

All active waste waters are conducted via pipelines to the building of active auxiliary operations (SE-EMO) either for cleaning on the cleaning station ion exchangers, or for processing on the cleaning station evaporator after being mixed with other waste waters and cleaned on the ion exchanger filters. The waste waters thus processed are released into the environment using a system operated by SE-EMO. The Hron river is the recipient of waste waters processed at SE-EMO.

The expected amount of waste waters released into the environment, on the basis of the annual processing capacity of FP LRAW, is 675m^3 from concentrate processing (i.e. 135m^3 per campaign), 43.2m^3 from the processing of sorbents and sludge, and approx. 230-240m^3/year from the drying of sorbents, liquid fractions, flushing water, condensates from air-conditioning, etc.

The PHA SR defined the following guide values (limits) for the liquid discharge activity from FP LRAW facility (Decision No. OOZPŽ/3190/2012 of 26 April 2012):

a) Tritium
$3.0x10^{11}$ Bq per year; $7.5x10^{10}$ Bq per quarter-year
b) other fissile product and corrosive products
$3.9x10^{9}$ Bq per year, $9.7x10^{8}$ Bq per quarter-year

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

Table IV.2.2./01

Discharges into the hydrosphere – FP LRAW Mochovce, year 2011

Discharges into the hydrosphere 2011	Discharges into the hydrosphere – FP LRAW Mochovce						
	Monthly amount [m^3]	^3H [limit: 300GBq]			Corrosive & fissile products [limit: 3.9GBq]		
		Monthly value [GBq]	Yearly value [GBq]	**Yearly value [% lim.]**	Monthly value [GBq]	Yearly value [GBq]	**Yearly value [% lim.]**
January	13.3 (emerged condensate)	2.18	2.18	**0.727**	0.0240	0.0240	**0.615**
February	22.0 (emerged condensate)	1.39	3.57	**1.19**	0.0006	0.0246	**0.631**
March	14.0 (emerged condensate)	0.68	4.25	**1.42**	0.0003	0.0249	**0.638**
April	85.4 (emerged condensate)	5.93	10.18	**3.39**	0.0016	0.0265	**0.679**
May	12.1 (waste waters)	0.22	10.40	**3.47**	0.0149	0.0414	**1.062**
June	11.0 (emerged condensate) 11.1 (waste waters)	0.60 0.15	11.15	**3.72**	0.066 0.007	0.1144	**2.933**
July	9.6 (emerged condensate)	0.97	12.12	**4.04**	0.107	0.2214	**5.68**
August	12.7 (emerged condensate) 9.0 (waste waters)	1.72 0.02	13.86	**4.62**	0.231 0.023	0.4754	**12.19**
September	9.8 (waste waters)	0.02	13.88	**4.63**	0.016	0.4914	**12.60**
October	31.2 (emerged condensate) 32.6 (waste waters)	1.99 0.61	16.48	**5.49**	0.008 0.079	0.5784	**14.83**
November	10.0 (waste waters)	0.04	16.52	**5.51**	0.018	0.5964	**15.29**
December	10.0 (waste waters)	0.12	16.64	**5.55**	0.011	0.6074	**15.57**

2.3. Waste

FP LRAW ***facility*** is the source of ***common*** operation ***waste*** (e.g. metal rings from MEVA barrels, rubber seals, iron packs from sealing materials and colours, paper packs (bags), used neon lamps, oils from service and maintenance shops, mixed municipal waste, inactive air-conditioning filters, etc.) in limited amounts at a total volume of approx. 1.5-2t/year.

The Proponent manages all waste in accordance with the applicable legislation with an emphasis on the prevention of waste generation and preferentially on recycling.

Specific waste produced by the proposed activity is ***radioactive waste,*** or waste materials contaminated by radioactive substances.

Radioactive waste directly related to the performed activities is LRAW defined and described in detail in Chapter IV.2.2.

Other waste with RAS contents is solid RAW (SRAW) which is also generated during technological activities:

- ✓ with the bituminization of concentrates (column fills /active coal/ for emerged condensate cleaning);
- ✓ with cementation (the sediment of the cement filler is preserved after the cementation line flushing and is to be filled directly into FCCs at the FP LRAW facility).

Secondary waste produced in various safeguarding and support activities, such as:

- ✓ decontamination works;
- ✓ repairs and maintenance of equipment entering into contact with RAS;
- ✓ air-conditioning system operation (filters).

These materials are treated as radioactive waste, depending on their properties which determine the method of their processing at BPC RAW Jaslovské Bohunice (e.g. incineration, etc.). Such waste is transported to the BPC RAW site together with other solid RAW from SE-EMO.

The Pre-Operation Safety Report estimates the following amounts of secondary solid RAW at full processing capacity of the FP LRAW facility:

	Amount [kg/year]
Solid, combustible	1,200

Solid, pressable	250
Solid, incombustible, non-pressable	500
Air-conditioning filters	2,350

Approx. 1,260kg of combustible RAW was produced in 2011 and transported to the BPC RAW Jaslovské Bohunice in 36 barrels.

2.4. Noise and Vibrations

The sources of noise from FP LRAW ***operation*** are diverse technological equipment, such as pumps, mixers, 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 freight transport with irregular frequency (under a conservative estimate of max. 1-2 freight cars/day), operating exclusively during day hours on working days.

The generation of vibrations of appropriate intensity is also connected with some technological equipment (e.g. sliding devices for FCCs, etc.), but their occurrence is tied to its immediate vicinity. Vibrations also originate from the traffic in the facility surroundings (using freight cars with a higher load capacity or with a semi-trailer).

2.5. Radiation and Other Physical Fields

FP LRAW serves for the processing and treatment of LRAW that contains various radionuclides with various activities. As a result of these activities, the FP LRAW nuclear facility 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.).

The FP LRAW premises and surroundings are under the impact of ionizing radiation.

For the FP LRAW facility, the PHA SR stipulated, by Decision No. OOZPŽ/3190/2012 of 26 April 2012, 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 10μSv/year. The RD EMO computing programme will be used to evaluate the radiological consequences.

Under the conservative approach (worst possible operating conditions), the Pre-Operation Safety Report of FP LRAW (October 2006) estimates the following amounts of RAS release *(analog to the limits applying to JAVYS NF in Jaslovské Bohunice in the case of*

atmosphere releases, and corresponding to the limit values set for SE-EMO location in the case of hydrosphere):

Nuclide	***Atmosphere***	***Hydrosphere***
^{3}H	-	1.20E+13
^{60}Co	9.40E+07	1.10E+08
^{90}Sr	2.80E+07	9.99E+08
^{137}Cs	8.46E+08	9.90E+08
$^{238+239}Pu$, ^{241}Am	8.80E+06	-
Total	1.848E+09	1.20E+13

For this assignment, the RD EMO computing programme calculated the highest effective individual dose in zone 65 (ESE direction, 4km distance) for babies at the age of 0-1 years at the value of 1.19μSv.

In 2011, the maximum individual effective dose in zone 64 (ESE direction, 4km distance) was calculated for babies at the age of 0-1 years at a value of $1.303x10^{-9}$ Sv (nSv) on the basis of actual operation outputs, which is a value three orders of magnitude lower than the value estimated by the Pre-Operation Safety Report for limit discharges, and almost four orders of magnitude lower than the permitted limit.

2.6. Odour and Other Outputs

The FP LRAW facility is not a relevant source of pollutant discharges into the municipal environment which would change the odour conditions in the surroundings.

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

2.7. Additional Data

The respective activity has already been executed 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 Nový Tekov municipality in the cadastral territory of which the FP LRAW facility 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 FS RAW facility location 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 results of calculation of the effective doses from limit discharges for the population, which were set for the Pre-Operation Safety Report (refer to Chapter IV.2.5.), where the highest effective dose concerned zone 65 at a 4km distance in ESE direction.

The built-up area closest to the FP LRAW facility is the recreation facility of Nový Tekov municipality at Starý vrch in the south-east direction at a distance of approx. 800-900m.

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

The FP LRAW ***operation*** induces 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 existence of stable jobs within the given territory and the possibility of a systemic and comprehensive approach to the treatment of LRAW produced in the SE-EMO installation which forms part of the affected area.

The direct negative impacts of the respective activity on the affected population include contribution to the radiation burden of the area and related traffic load, including noise.

The outcomes of the ***evaluation of radiation impacts and discharges*** from the FP LRAW facility imply that the facility largely respects the set limits, and the effective dose per person generated by FP LRAW is several orders of magnitude lower than the effective dose limit set for this nuclear facility by the PHA SR.

With regard to ***traffic load*** at the location, the conservative approach (i.e. assessment of the maximum frequency of related freight transport – four drive-throughs are planned for 1 to 2 freight cars per day) imply that the contribution of the activity to the traffic load in the monitored section affected by the traffic connection of the SE-EMO site would represent only 0.9% of freight transport and 0.18˘% 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, and that the transport route of FCCs with fixed RAW to the NRAWR at a 3km distance from FP RAW

runs outside of residential areas. In 2011, only one transport of SRAW aimed for processing at BPC RAW in Jasovské Bohunice was carried out.

Indirect 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.

As far as ***other potential impacts*** of the respective activity are concerned, due to the distance and location of the closest non-industrial built-up area and the nature of the activity, it is irrelevant to consider impacts on the population produced by noise emissions from installed technological equipment and by emissions from common pollutants. At the same time, the low amounts of common operation wastes and common sewage and rain waste waters managed through the SE-EMO sewage system do not represent a source of any impact of major significance on the affected population.

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

The impacts on the geological environment, whether direct or indirect—in the form of contamination—are irrelevant for common operation due to the nature and design of the activity. The potential risk of contamination as a result of non-standard operating conditions (e.g. leakage, accidents during the filling and transport of barrels with bitumen filler, etc.) can be prevented by emergency measures for the operating premises of FP LRAW (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 by RAS is prevented by respecting 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. Such a leakage, however, would not necessarily affect the geological environment in the case of early and effective intervention.

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 proposed activity with its nature does not induce such phenomena at the affected location. The design of buildings and installation of FP LRAW technology took into consideration the results of the evaluation of the ***seismic risks*** at the affected location.

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

Due to its nature and design, the proposed activity will not comprise any incineration processes or any other technological processes that would constitute a source of greenhouse gas emissions. Heat required for the facility processes is supplied by SE-EMO.

3.4. Impacts on Air

Given the nature of the performed activities, no relevant emissions of common pollutants are produced in the FP LRAW ***facility*** with regard to their amounts (e.g. VOC emissions can be released after heating upon bitumen treatment; the cementation process—the handling of dusty materials—can cause moderate dust nuisance increase; after extracted, the air is cleaned at TZL filters, etc.).

Air in the controlled zone of the FP LRAW building is burdened with RAS aerosols, due to which the air is extracted, cleaned by aerosol filters, monitored, and only then it is discharged to municipal air through the SE-EMO venting chimney. Though, the FP LRAW facility´s contribution to atmosphere contamination by RAS has long been under the set limit level (refer to Table IV.2.1./01).

The FP LRAW operation also has an indirect minimal impact on the air emissions produced by traffic in the given area. This contribution to the emissions, however, does not have an impact of major significance on the air quality of the affected area (at a maximum frequency of four drive-throughs by freight cars/day).

3.5. Impacts on the Water Conditions

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

The execution of the activity is accompanied by the production of sewage and rain waste waters at amounts corresponding to the area of FP LRAW buildings (including adjacent reinforced areas) and the number of employees; the sewage and rain waste waters are managed on a contractual basis (as a minority share) within the SE-EMO sewage system.

The FP LRAW facility also produces technological waste waters contaminated by RAS, which, after being processed at SE-EMO and monitored, are released to the environment (again through the SE-EMO sewer system). The Hron river is the recipient of such waste waters. The amounts of discharged technological waste waters largely comply with the limits set by the PHA SR (refer to Table IV.2.2./01). The potential risk of water contamination as a result of non-standard operating conditions is prevented either by the operating premises design (sealed joints between floors and walls, water-proof floors and reasonable height walls, premises sloped to the active sewage system), and by the used methods as part of the approved emergency plan (EP) of the FP LRAW facility (e.g. the activity of cooling waters is being monitored; if the set limit values of the activity are exceeded, the system is shut down until the source of activity is identified, and active cooling water is subsequently pumped to the active waste waters, etc.).

The flow conditions of the recipient (Hron river) suggest that the FP LRAW facility, with the stated amounts of waste waters (refer to Table IV.2.2.), has a negligible impact with another approx. 450,000m^3 of waste waters per month discharged from SE-EMO.

The FP LRAW can also have the potential of a positive change in the future as a result of the pipeline connection adjustment which will allow for the pumping of the produced active waste waters (currently pumped for disposal purposes at SE-EMO) to be processed at FP LRAW as part of the active cement filler of FCCs.

With regard to the draining conditions of the location and the ground water network, the FP LRAW facility´s impact can be assessed as practically negligible considering, for example, the scope of the built-up area pertaining to the facility from which rain waters are drained directly to the Hron river, or absence of ground water use for the facility purposes.

3.6. Impacts on Soil

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

The FP LRAW ***facility*** is located within the existing SE-EMO 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 concluded that under normal operating conditions the FP LRAW facility is 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

Mochovce location; in 2011, no impacts of SE-EMO installations (including discharges from FP LRAW) on the background radionuclide values in soils in the SE-EMO surroundings were recorded.

The potential risk of contamination as a result of non-standard operating conditions was assessed under the Pre-Operation Safety Report, which analysed various emergency scenarios. The Report concludes that the FP LRAW operation will not create an area in the surroundings of the facility that would threaten life, health or property in the case of extraordinary events accompanied with the release of hazardous pollutants.

Non-standard situations of common nature, 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 FP LRAW ***facility*** is located within the existing SE-EMO site. The FP LRAW building is in no direct contact with biotopes outside of the internal green areas. 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 forest biotopes at Veľká Vápenná and the biotopes in the surroundings (biotopes at forest borders, meadow biotopes, etc.) at an approx. 200m distance eastwards.

These distances and the nature of the activity which is not associated with people´s dispersion in the adjacent, less anthropogenically altered biotopes suggest that the proposed activity does not represent a source of more significant impacts on the fauna, flora and their biotopes. This also applies to the health condition of the fauna and flora in the given location (including their biotopes) with regard to the conclusions of regular monitoring evaluation of soil activity, grass, aerosols, waters, sediments, snow falls, rain falls, agricultural production samples, fish and ambient dose equivalent rates, which assess the radiological impacts of the SE-EMO facility (including FP LRAW discharges) as minimal (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 proposed activity is situated within the SE-EMO site. With its concept and architecture, the FP LRAW building is designed as a standard industrial building. Hence, the FP LRAW impact on the landscape scenery, its image and structure is negligible.

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

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 FP LRAW facility operation will not affect the structure of the given urban units.

The traffic connection of the FP LRAW facility affects the technical infrastructure of the SE-EMO site and the transport infrastructure of the affected area (the FP LRAW facility´s share in traffic load by freight cars is max. 0.9%).

The LRAW facility has only an indirect potential impact on the agricultural and forest management use of land through the facility´s contribution to the radiation burden of the area. This contribution is minimal (confirmed by regular systematic monitoring which also includes monitoring of activities of selected agricultural commodities, such as milk, grass, meat, etc.), and does not represent a risk to health or property in the FP LRAW surroundings not even under non-standard operating conditions.

The FP LRAW facility has a large impact on the industrial use of the area within the given location in the form of SE-EMO, since it represents for SE-EMO the possibility to treat its LRAW in a safe and comprehensive way, as much as the legislation, for safety reasons, does not allow LRAW transport from a nuclear facility without being pre-treated/fixed (and hence the possibility of LRAW processing in another processing centre in Jaslovské Bohunice) (NRA SR Decree No. 30/2012 Coll.).

The generation of minimum waste amounts (approx. 1-2t/yr), comprising common operating (predominantly recyclable) waste, such as packing materials, waste from maintenance of equipment and premises, municipal waste, etc., has minimum impacts on common waste management of the affected area.

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

3.10. Impacts on Cultural and Historic Monuments

No monuments 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 FP LRAW facility.

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 FP LRAW facility as part of the SE-EMO site.

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 FP LRAW facility that could be affected by the facility 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 FP LRAW facility operation. The nature of the proposed activity excludes impacts on local habits and traditions.

3.14. Other Impacts

No other impacts of FP LRAW operation 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 in case the given activity is connected with radiation burden only.

With regard to FP LRAW facility, the PHA SR defined, by its Decision No. OOZPŽ/3190/2012 of 26 April 2012, the conditions 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 10μSv/year. The RD EMO computing programme should be used to assess the radiological impacts.

For a conservative approach (worst possible operating condition), the Pre-Operation Safety Report of FP LRAW (October 2006) considered RAS discharges in the atmosphere analog to those applying to JAVYS NF in Jaslovské Bohunice, and RAS discharges in the hydrosphere according to the limit value for SE-EMO location (for more details refer to Chapter IV.2.5). For this assignment, the RD EMO computing programme set the highest effective individual dose in zone 65 (ESE direction, 4km distance) for babies at the age of 0-1 years at the value of 1.19μSv.

On the basis of actual operation outputs, the maximum individual effective dose in zone 64 (ESE direction, 4km distance) has been calculated for babies at the age of 0-1 years for the last ended year of 2011, as described in detail above, and its value has reached 1.303×10^{-9} Sv (nSv), which is a value three orders of magnitude lower than the value considered for the pre-operation safety report for limit discharges, and almost four orders o magnitude lower than the permitted limit.

Hence, it can be concluded that the FP LRAW facility does not represent any health risk for the affected population under common operating conditions.

The Pre-Operation Safety Report also deals with non-standard operating conditions of the facility, describing various emergency scenarios, either caused by technical or human factor failures, or by external factors (e.g. floods, earthquakes, etc.). The Report concludes that the FP LRAW operation will not create an area in the surroundings of the facility that could threaten life, health or property in the case of extraordinary events accompanied with release of hazardous pollutants.

The inhabitants of the affected municipalities can be potentially exposed to radiation burden in connection with RAW transport. In order to reduce this risk, the transport is carried out in compliance with 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 to ensure radiation protection in activities causing irradiation and activities important with regard to radiation protection.

It should be noted in this regard that the principal part of RAW transport is represented by the transport of output fibre concrete containers to the NRAWR at a geodesic distance of approx. 3km (from the FP LRAW facility); the transport route is conducted outside of the built-up area. The only radioactive waste carried through a built-up area is SRAW aimed for processing in BRAWPC Jaslovské Bohunice (one transport was recorded in 2011).

There is therefore no expected health risk for the inhabitants of the affected municipalities.

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 directly affect any small or large protected area or their protection zones.

The closest protected areas are:

- ✓ Large protected area:
  - ➢ Protected Landscape Area Štiavnické vrchy (north-east from SE-EMO site at a distance of approx. 10km);
- ✓ Small protected areas:
  - ➢ National Natural Reservation Patianska cerina (approx. 7km south-west from SE-EMO site);
  - ➢ Protected area of Arborétum Mlyňany (approx. 8km north-west from SE-EMO site);
- ✓ NATURA 2000 sites:
  - ➢ SKCHVU038 Žitavský luh (approx. 18km south-west from SE-EMO site);
  - ➢ SKUEV0263 Hodrušská hornatina (approx. 9km north-east from SE-EMO 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 FP LRAW site 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 SE-EMO facility (including FP LRAW discharges) in the affected location, that this (cumulative) impact is minimal.

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 relation to and inevitable character of the SE-EMO operation in the field of LRAW treatment.

7. EXPECTED IMPACTS BEYOND STATE BORDERS

As shown above, the FP LRAW impacts on the radiation burden under normal operating conditions, as well as under emergency or otherwise non-standard operating conditions, is minimal (it has not been necessary for the facility to propose declaring a disaster area for extraordinary events connected with the release of hazardous pollutants potentially threatening life, health or property; the maximum individual effective dose in zone 64 (E-S-E direction, 4km distance) for babies at the age of 0-1 year calculated for the year 2011 was 1.303×10^{-9} Sv).

At the same time, the Pre-Operation Safety Report of FP LRAW (October, 2006), using a conservative approach (worst possible operating conditions, possible RAS release into the atmosphere analog to JAVYS NF limits in Jaslovské Bohunice, and into the hydrosphere according to the limit values for SE-EMO location, for more details refer to Chapter IV.2.5.), defined the maximum effective individual dose in zone 65 (ESE direction, 4km distance) for babies at the age of 0-1 years at the value of 1.19μSv by means of the RD EMO computing programme.

On the basis of the brief summary of conclusions of the previous chapters it can be concluded that no negative impacts reaching beyond the state borders are expected in connection with the proposed activity.

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

The conclusions of the safety analysis can be summarised as follows:

1. With regard to emergency planning and the need to adopt immediate measures – the calculated values of effective doses for adults from external and internal irradiation as a result of the inhalation of radioactive substances from a possible release of radioactive substances into the atmosphere at an early accident phase will not exceed the action amounts for the adoption of measures to protect the population, i.e. independent emergency planning for the FP LRAW facility is not necessary.
2. With regard to permitted annual doses for the population – the calculated values of effective doses for adults from external and internal irradiation as a result of a possible release of radioactive substances will not exceed the annual limit value per individual ($1x10^{-3}$ Sv).

Hence, these analyses imply that in the case of extraordinary events the legally set limits for the declaration of a disaster area will not be reached or exceeded in the surroundings of the FP LRAW facility, i.e. such an extraordinary event connected with hazardous pollutants release will not create an area in the facility surroundings that would threaten life, health or property.

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 treatment of LRAW generated by SE-EMO would not be solved, as the Slovak legislation clearly stipulates the obligation to transport LRAW from a nuclear facility to the processing site via pipelines, unless it is technically non-viable or

economically unbearable, i.e. primary processing of LRAW produced by SE-EMO in a processing centre, for example in Jaslovské Bohunice, is therefore unacceptable.

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

The proposed activity will be implemented in the cadastral territory of the Municipality of Nový Tekov, which is part of the Nitra Self-Governing Region. Further to Territorial Plan of the Higher Territorial Unit of Nitra Self-Governing Region, the binding part of which was published by Generally Binding Regulation No. 2/2012, the SE-EMO area is a technical infrastructure and transport area.

The proposed activity complies with the described way of functional use of the area.

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)

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, can be in general defined as the most important assessment criteria (given the risk potential). The importance of the

proposed activity for the safety and complexity of the treatment of LRAW produced upon SE-EMO operation is also an important 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 a facility for the treatment and processing of liquid RAS produced upon SE-EMO operation—concentrates, saturated sorbents and sludge.

The abandonment of the alternative solution was requested by letter No. 2012/11868 of 03 August 2012. The MoE SR approved the request by letter No. 4554/2012-3.4/hp of 10 August 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 SE-EMO operation at the given location.***

3. JUSTIFICATION OF THE OPTIMAL OPTION PROPOSAL

The existence of the proposed activity in the given location creates the conditions for the next inevitable step in the treatment of LRAW produced by SE-EMO operation, since the Slovak legislation (NRA SR Decree No. 30/2012 Coll.) permits transport of LRAW generated in a nuclear facility in transport units (and not via pipelines) only where it is technically non-viable or economically unbearable.

According to the design of the technological system, the treatment of LRAW excludes the need to ship the transportable intermediate product, i.e. the output product of the FP LRAW technological system is the final packing unit (FCC), which can be subsequently transported and stored directly at the NRAWR Mochovce (at a geodesic distance of approx. 3km from FP LRAW facility).

With regard to the nature of the proposed activity and the distance and location of the closest non-industrial built-up area, and considering the fact that the FP LRAW facility is located within the SE-EMO site, the noise emissions from the installed technological equipment, the emissions of common pollutants, common sewer and rainfall waste waters forming part of the SE-EMO sewer system, etc., have negative impacts of minimum and often negligible intensity in the affected area. The same applies to impacts related to the production of limited amounts of common operating waste, impacts on the use of the landscape, its scenery, image, etc.

Out of negative impacts, only the impacts related to the radiation burden of the area generated by the assessed operation and the induced traffic load appear to be potentially more important.

The above-mentioned outcomes of the radiation impact and discharge assessment of the FP LRAW facility imply that the facility complies with the set limits often within a big margin, and the effective dose per person generated by FP LRALW is several orders of magnitude lower than the effective dose limit set for this nuclear facility by the PHA SR (evaluation of the year 2011).

From the point of view of radiation burden due to RAW transport, it can be concluded that all the legislative requirements for radiation protection of the population have been respected and that the transport route of FCCs with fixed RAW to the NRAWR at a geodesic distance of approx. 3km, which represents the main share in the transport of radioactive materials in connection with the FP LRAW facility, runs outside of residential areas (only one transport of LRAW aimed for processing in the BPC RAW Jaslovské Bohunice was performed in 2011).

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 maximum contribution of the proposed activity (PA) to the traffic load in the given monitored section of the affected area as a result of the traffic connection of the SE-EMO site would be only 0.9% of freight transport and 0.18% of overall transport in the year of the last assessment.

On the other hand, the existence of this complex facility (the final product of processing is the final packing unit FCC) within the immediate vicinity of the NRAWR, and the place of generation of waste aimed for processing (LRAW generated by SE-EMO in the area of which the FP LRAW facility is located), provided that all the safety requirements for the operation of such facility are complied with, represent an important positive impact on the treatment process of RAW from NPP operation, and indirectly on the impacts generated by NPP operation.

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 LRAW generated by SE-EMO facilities.

VI. Maps and Other Graphic Documentation

Annex 1 Map of wider relations, including specification of the affected area
Annex 2 Map of the facility location within SE-EMO site
Annex 3 Illustrative photo-documentation of the facility
Annex 4 Withdrawal from the alternative option

VII. Additional Information about the Plan

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

SELECTED BIBLIOGRAPHY:

Hrdina, V. a kol., 2012: Územný plán regiónu Nitrianskeho kraja (AUREX, s.r.o., Bratislava)

Kolektív, 2008: Slovenské Elektrárne, a.s.: Atómová elektráreň Mochovce VVER 4 × 440 MW 3. stavba. Rel. 08508370478/R670 (Golder (Europe) EEIG,

Letkovičová, M., Letkovičová, H., 2001: Zdravotný stav obyvateľstva v okolí jadrových elektrární na Slovensku s dôrazom na rozbor úmrtnosti na leukémie (prezentácia pracovníčok Environment, a.s., Centrum bioštatistiky a environmentalistiky), Nitra

Slovenské elektrárne, a.s., 2012: Správa o kontrole rádioaktivity v okolí AE Mochovce za rok 2011

VUJE, a.s., 2006: Predprevádzková bezpečnostná správa FS KRAO Mochovce

and others.

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. 4554/2012-3.4/hp of 10 August 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. 6.

Preparation works are currently being conducted to change the pipeline connection of active waste waters and adjust the route of the cement filler. The MoE SR issued its opinion No. 6031/2012-3.4/hp of 15 June 2012 on these works, stating that the planned change will not have negative impacts on the environment and people´s health. At the same time, the Ministry recommended to assess these works in a complex manner due to the insufficient assessment under other related assessment processes (e.g. completion of SE-EMO blocks 3, 4).

VIII. Place and Date of the Plan Preparation

BRATISLAVA, 07 AUGUST 2012

IX. Confirmation of Information Accuracy

1. AUTHOR OF THE PLAN

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2. CONFIRMATION OF INFORMATION ACCURACY

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